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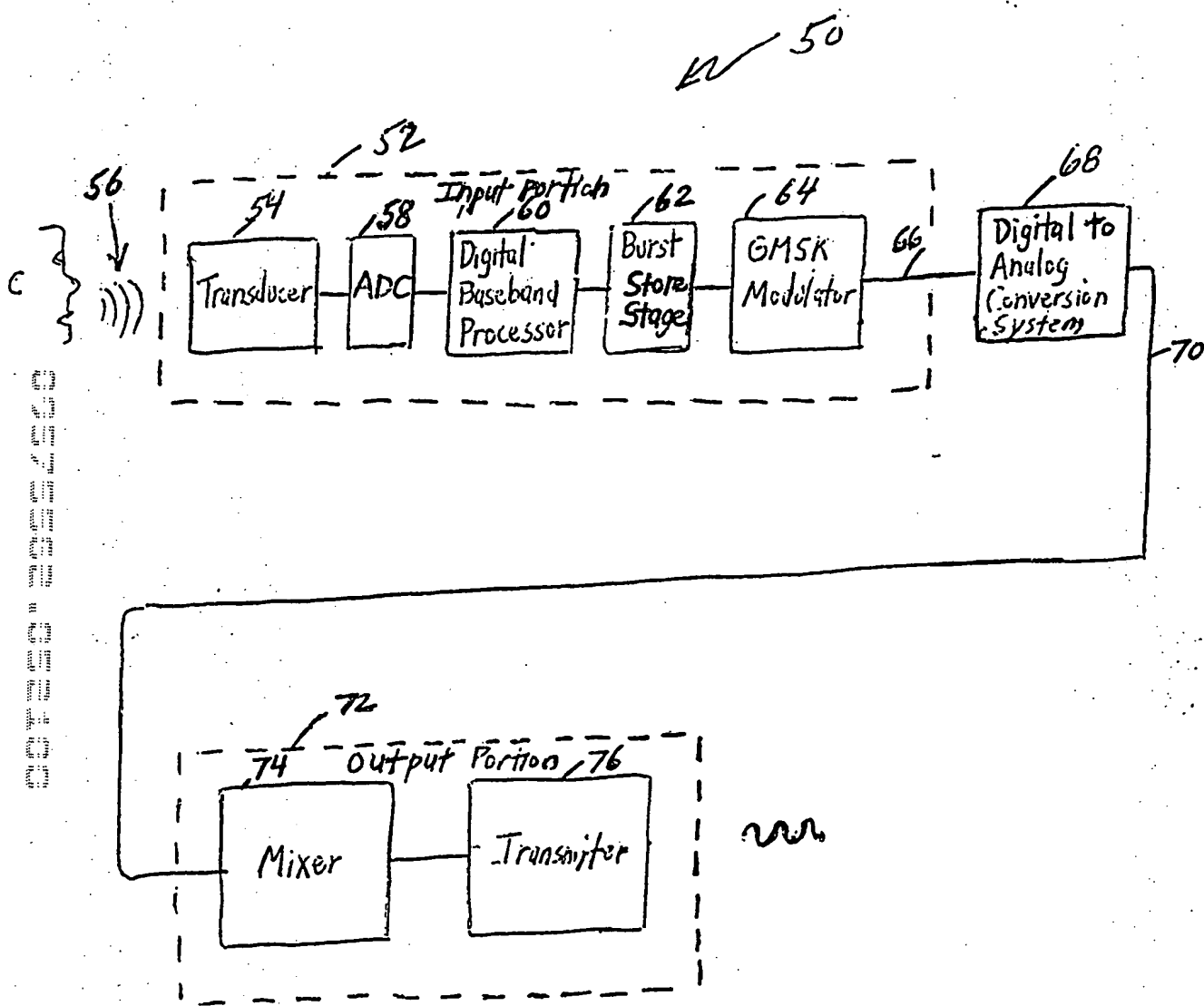


FIG. 1

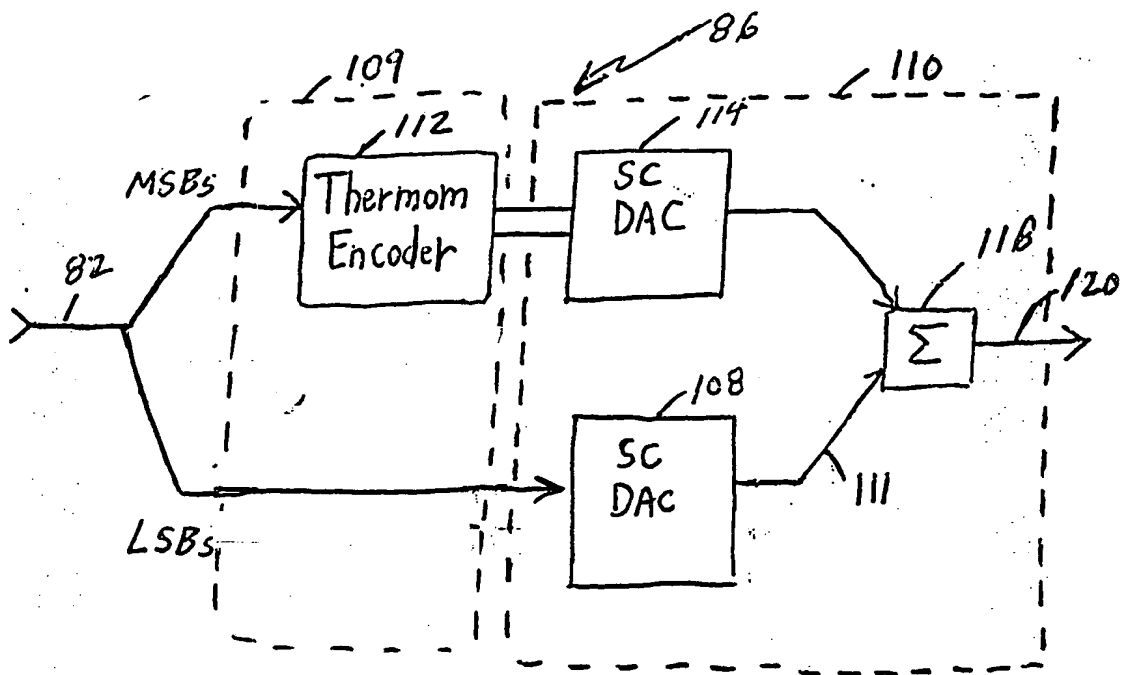


FIG. 3

150

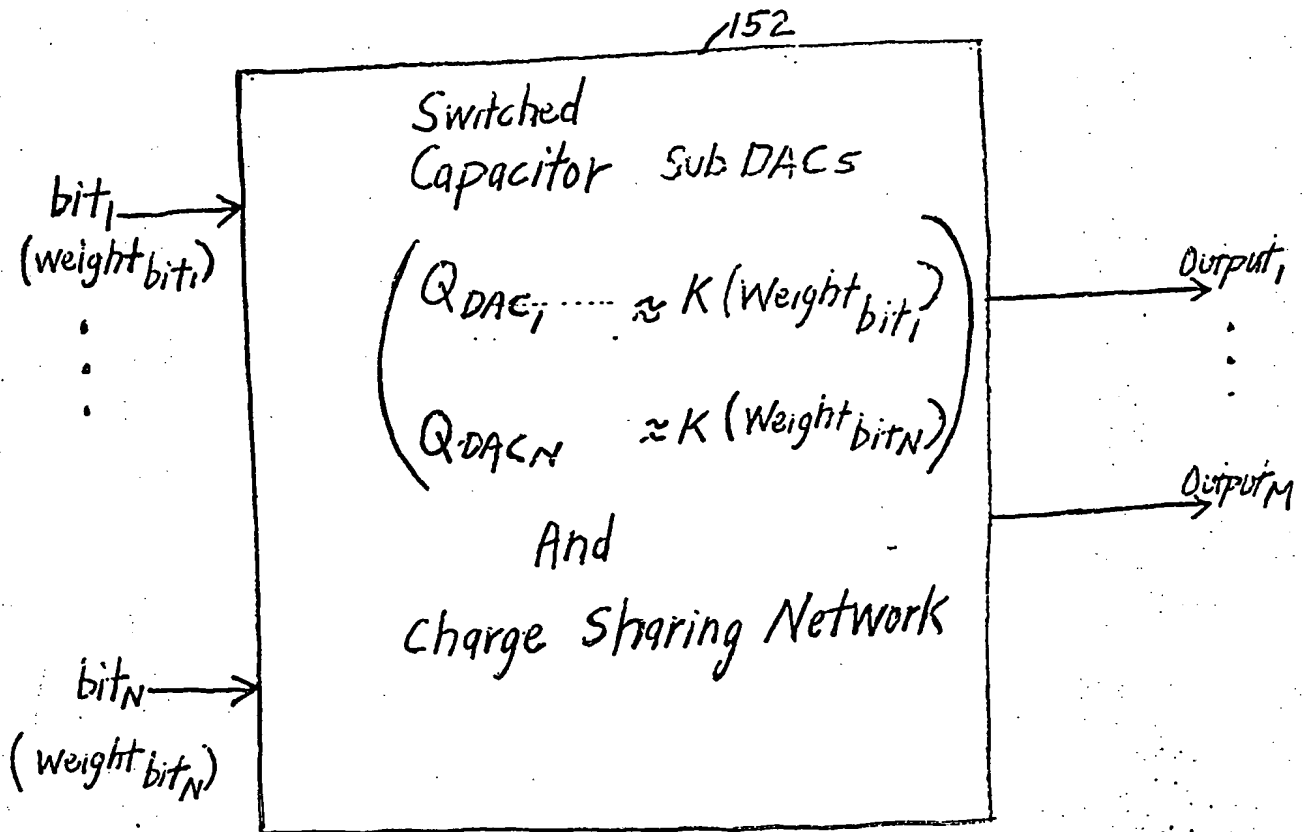


FIG. 4

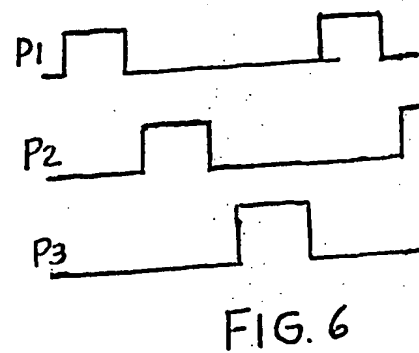
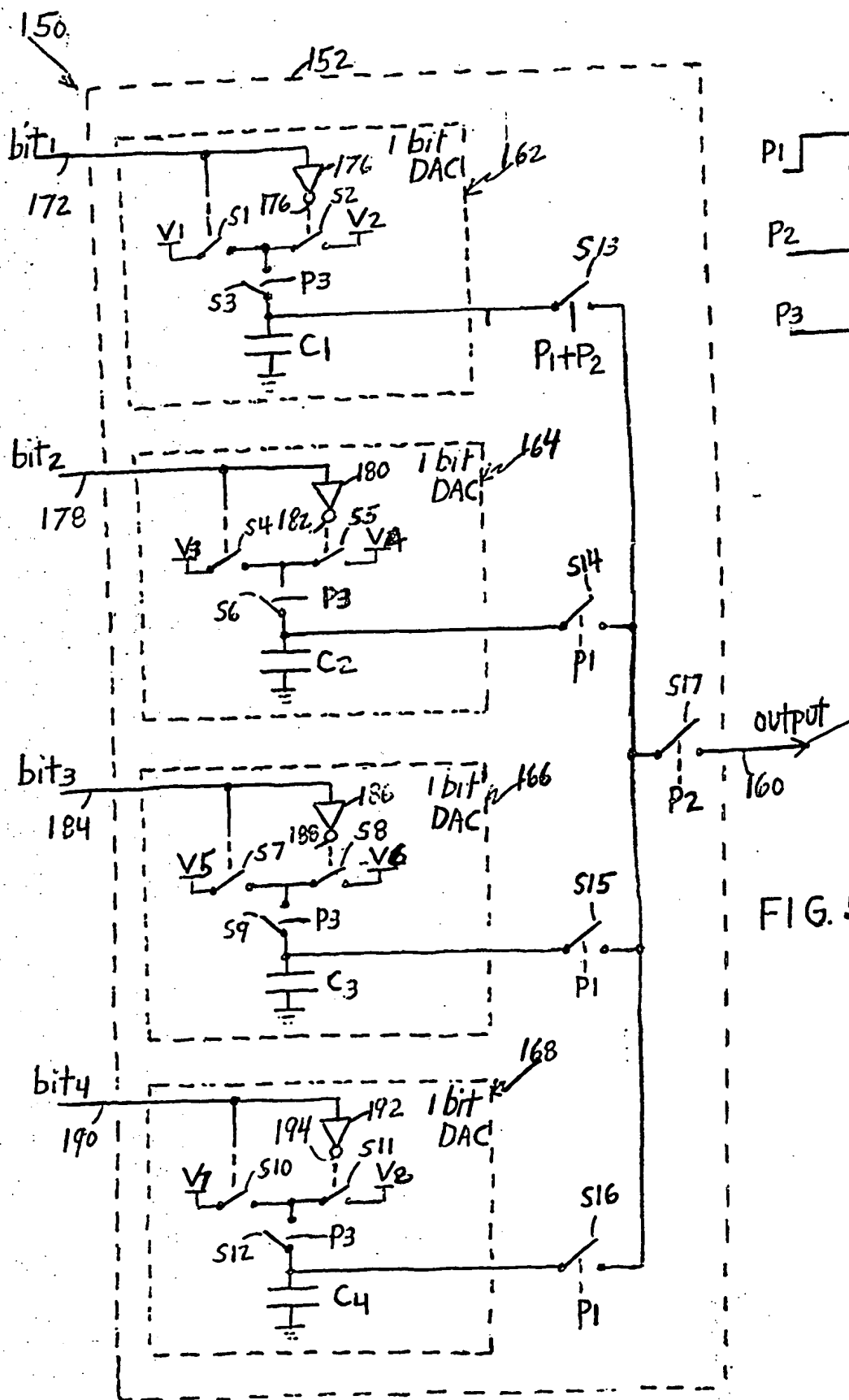
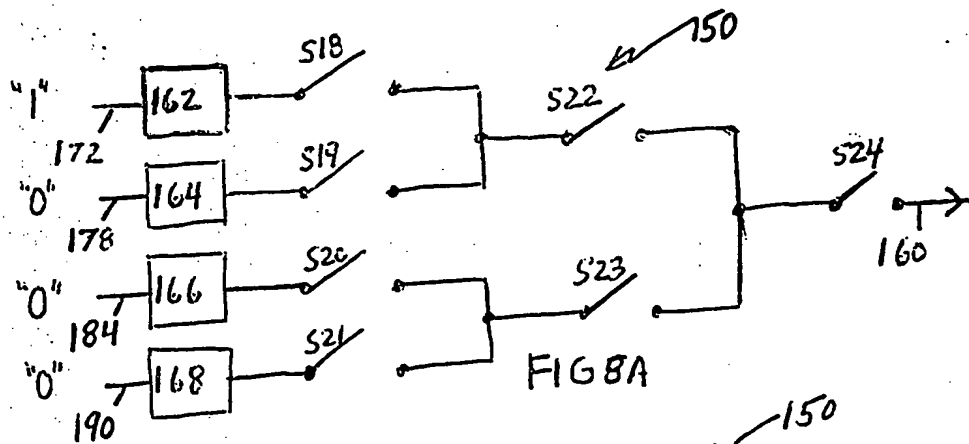
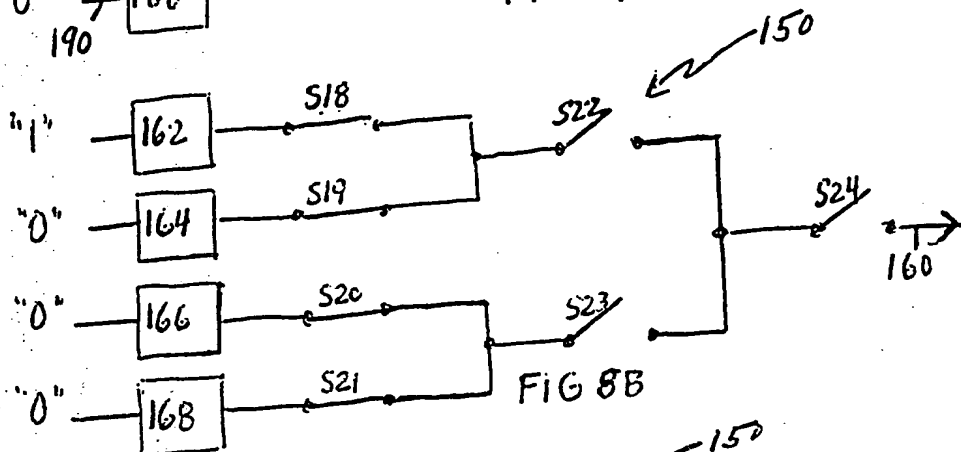


FIG. 5

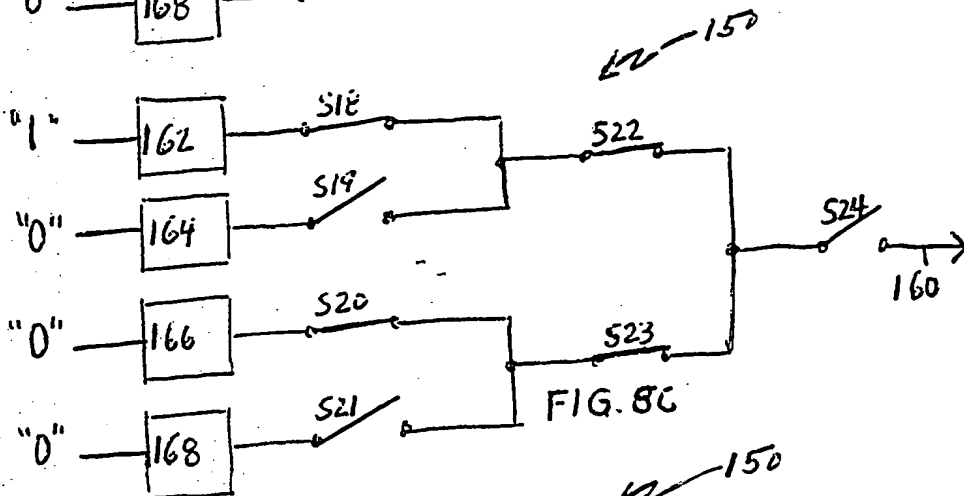
FIG. 6



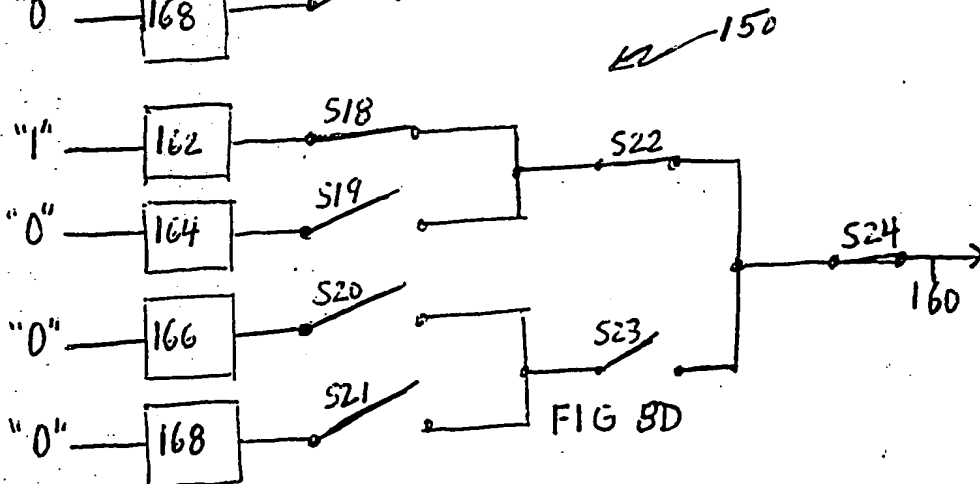
P1=0	V(C1)=Vref	Q(C1)=C*Vref
P2=0	V(C2)=0	Q(C2)=0
P3=1	V(C3)=0	Q(C3)=0
P4=0	V(C4)=0	Q(C4)=0



P1=0	V(C1)=Vref/2	Q(C1)=C*Vref/2
P2=0	V(C2)=Vref/2	Q(C2)=C*Vref/2
P3=0	V(C3)=0	Q(C3)=0
P4=1	V(C4)=0	Q(C4)=0



P1=1	V(C1)=Vref/4	Q(C1)=C*Vref/4
P2=0	V(C2)=Vref/2	Q(C2)=C*Vref/2
P3=0	V(C3)=Vref/4	Q(C3)=C*Vref/4
P4=0	V(C4)=0	Q(C4)=0



P1=0	V(C1)=Vref/4	Q(C1)=C*Vref/4
P2=1	V(C2)=Vref/2	Q(C2)=C*Vref/2
P3=0	V(C3)=Vref/4	Q(C3)=C*Vref/4
P4=0	V(C4)=0	Q(C4)=0

Master
Clock

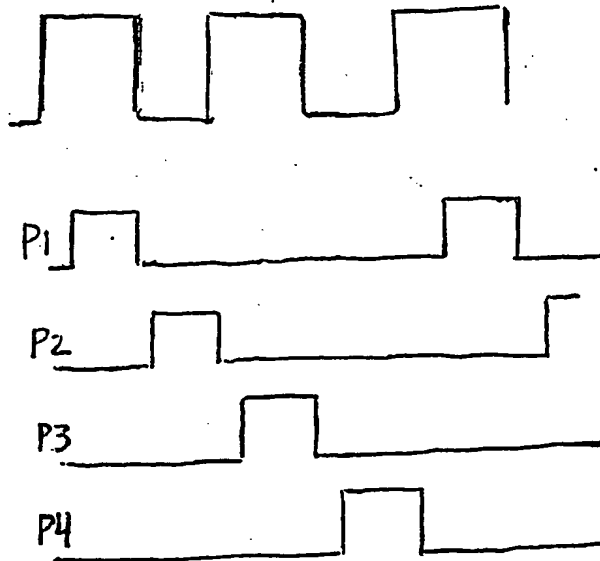
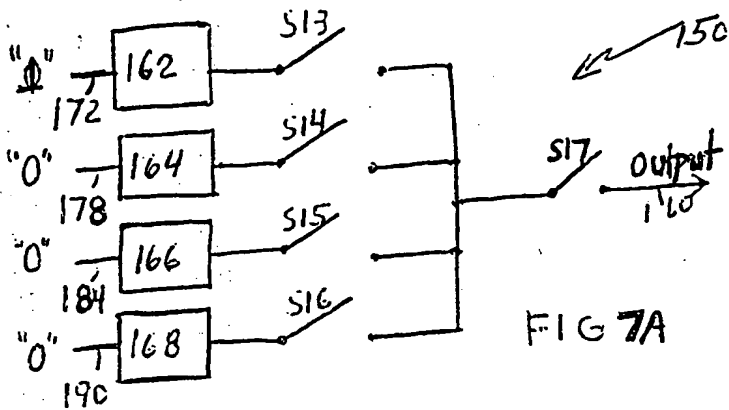
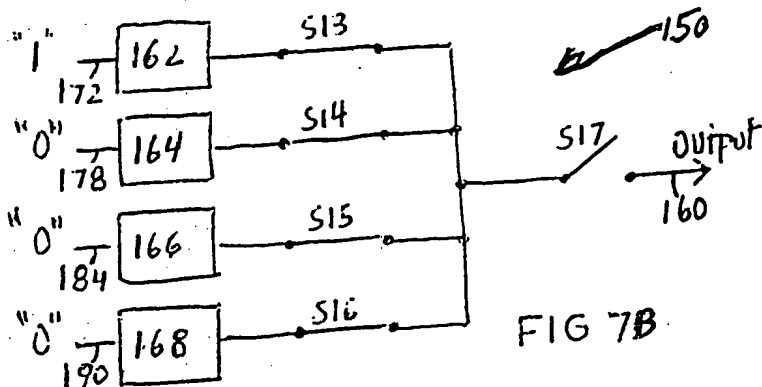


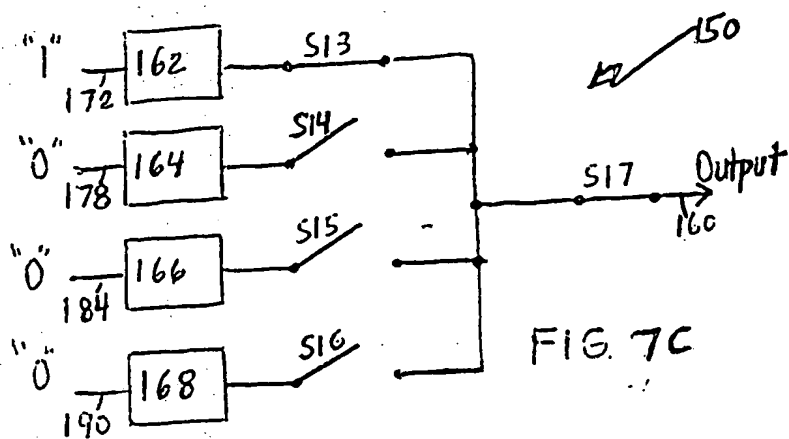
FIG 9



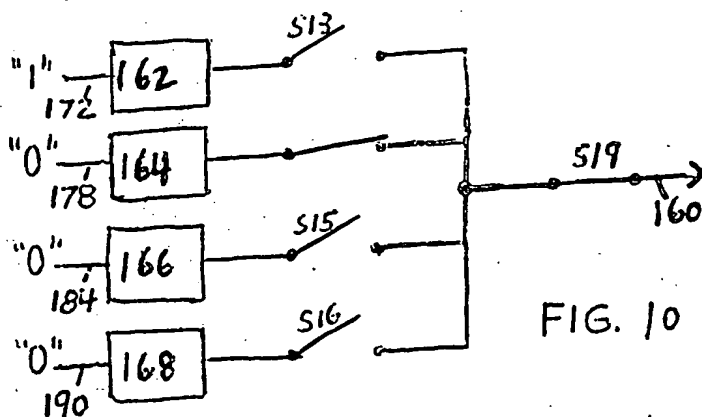
P1 "0"	$V(C_1) = V_{ref}$	$Q(C_1) = C + V_{ref}$
P2 "0"	$V(C_2) = 0$	$Q(C_2) = 0$
P3 "1"	$V(C_3) = 0$	$Q(C_3) = 0$
	$V(C_4) = 0$	$Q(C_4) = 0$

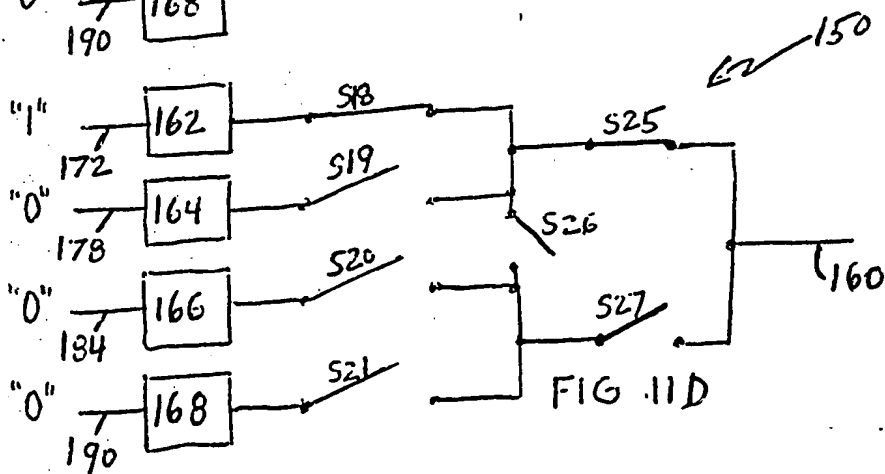
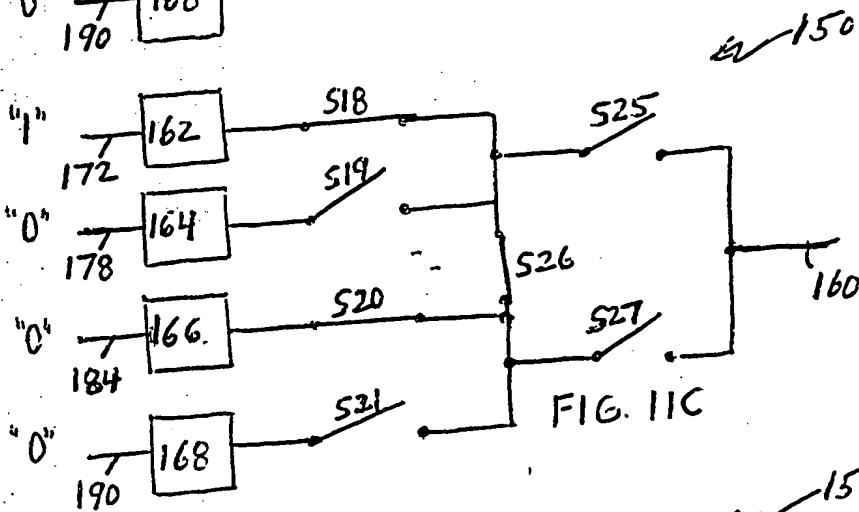
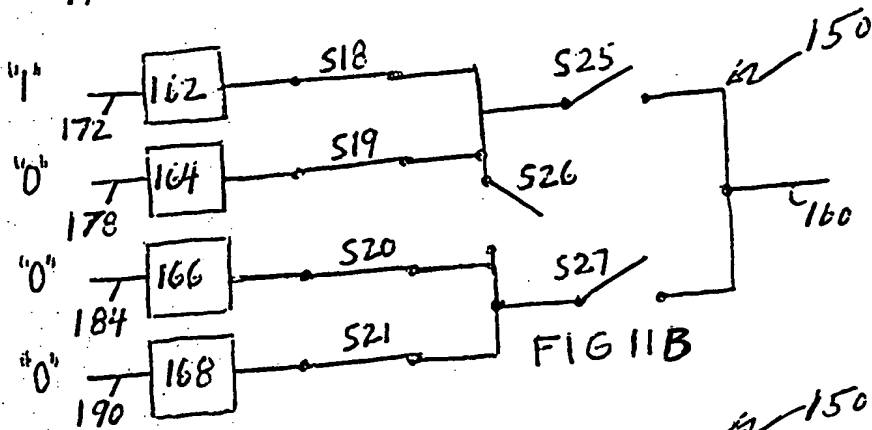
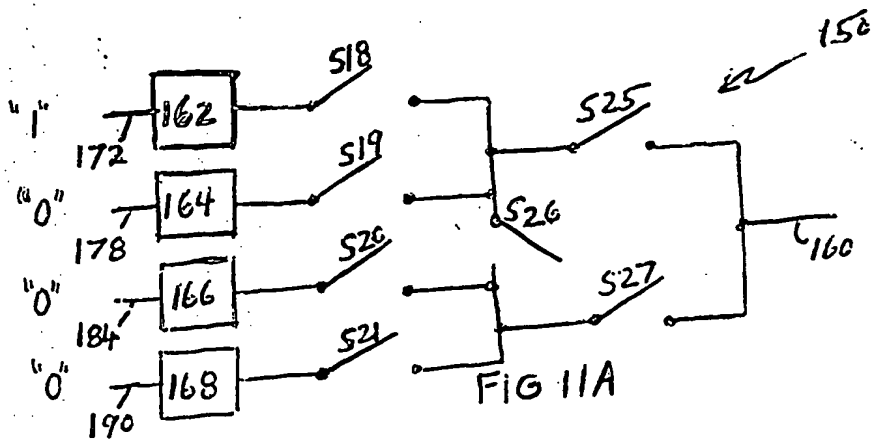


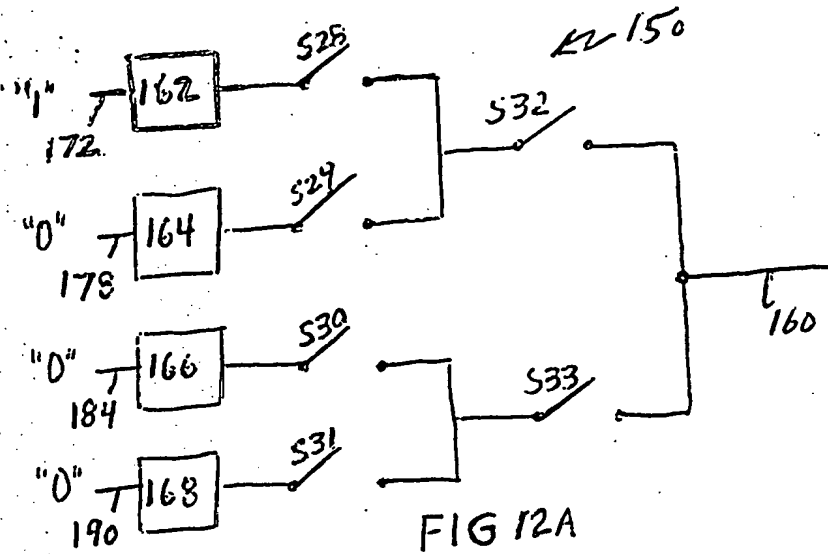
P1 "1"	$V(C_1) = V_{ref}/4$	$Q(C_1) = C + V_{ref}/4$
P2 "0"	$V(C_2) = V_{ref}/4$	$Q(C_2) = C + V_{ref}/4$
P3 "0"	$V(C_3) = V_{ref}/4$	$Q(C_3) = C + V_{ref}/4$
	$V(C_4) = V_{ref}/4$	$Q(C_4) = C + V_{ref}/4$



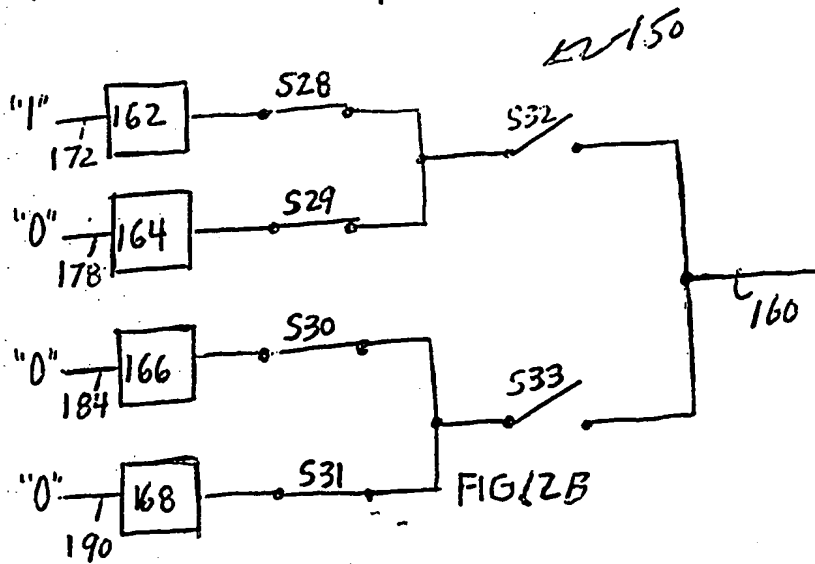
P1 "0"	$V(C_1) = V_{ref}/4$	$Q(C_1) = C + V_{ref}/4$
P2 "1"	$V(C_2) = V_{ref}/4$	$Q(C_2) = C + V_{ref}/4$
P3 "0"	$V(C_3) = V_{ref}/4$	$Q(C_3) = C + V_{ref}/4$
	$V(C_4) = V_{ref}/4$	$Q(C_4) = C + V_{ref}/4$



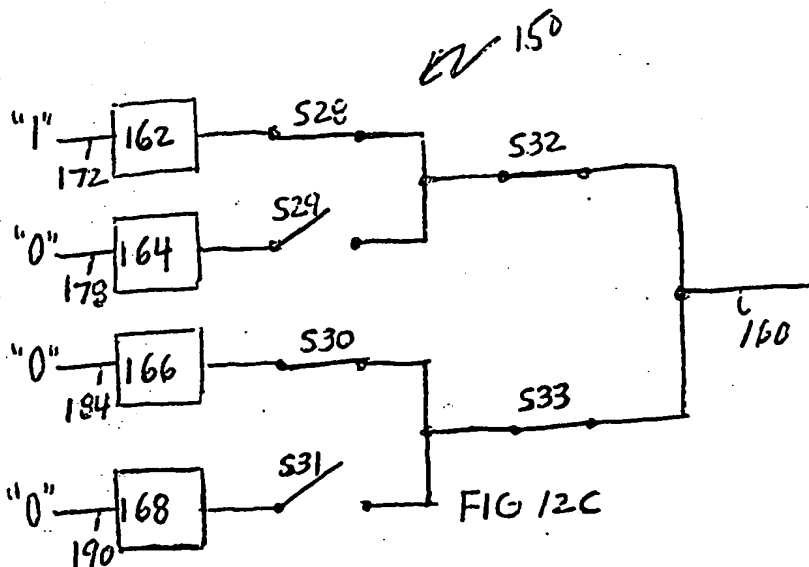




$P1=0$	$V_C(1)=V_{ref}$	$Q_C(1)=C+V_{ref}$
$P2=0$	$V_C(2)=0$	$Q_C(2)=0$
$P3=1$	$V_C(3)=0$	$Q_C(3)=0$
	$V_C(4)=0$	$Q_C(4)=0$



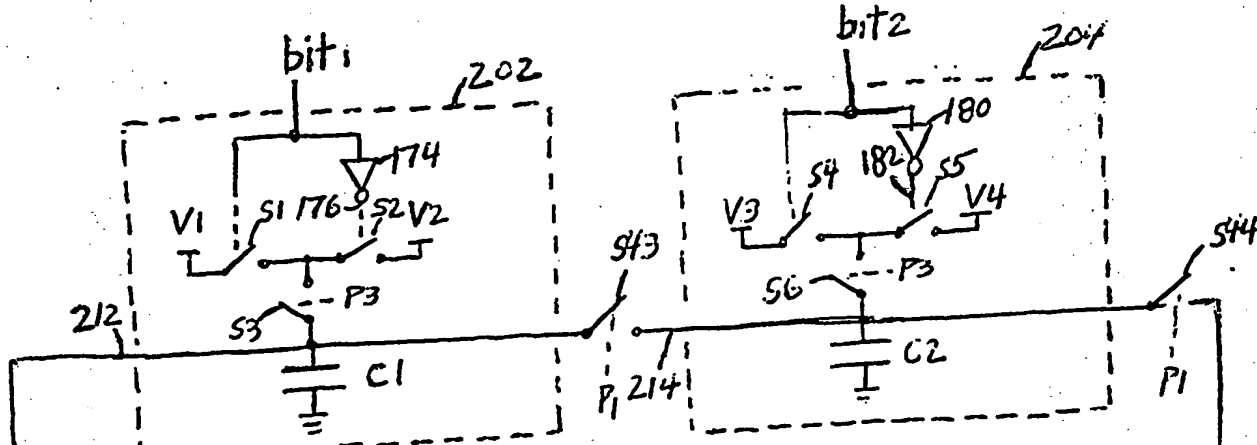
$P1=1$	$V_C(1)=V_{ref}/2$	$Q_C(1)=C+V_{ref}/2$
$P2=0$	$V_C(2)=V_{ref}/2$	$Q_C(2)=C+V_{ref}/2$
$P3=0$	$V_C(3)=0$	$Q_C(3)=0$
	$V_C(4)=0$	$Q_C(4)=0$



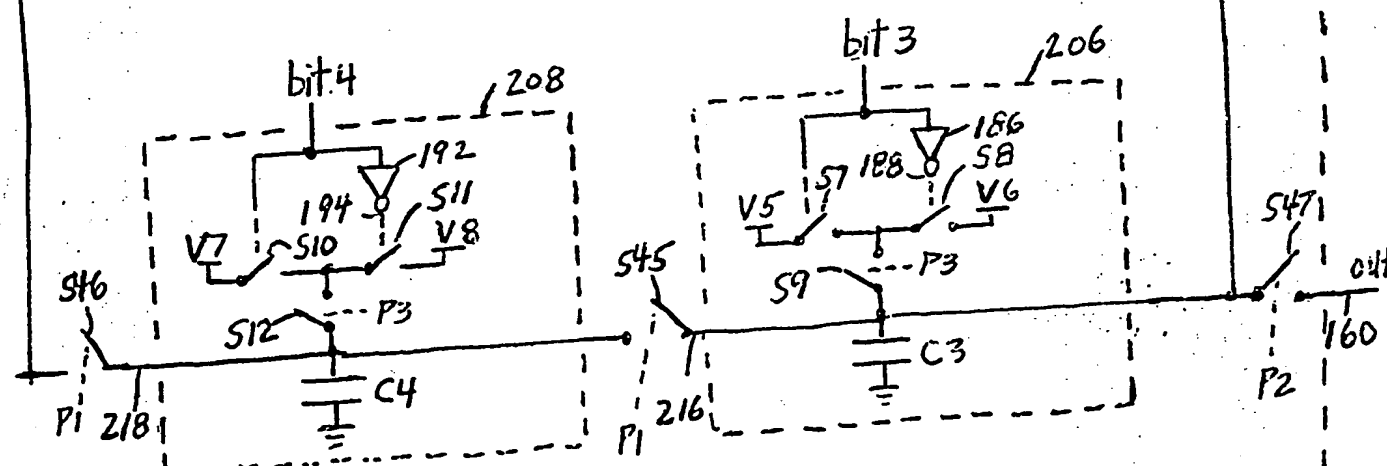
$P1=0$	$V_C(1)=V_{ref}/2$	$Q_C(1)=C+V_{ref}/2$
$P2=1$	$V_C(2)=V_{ref}/2$	$Q_C(2)=C+V_{ref}/2$
$P3=0$	$V_C(3)=0$	$Q_C(3)=0$
	$V_C(4)=0$	$Q_C(4)=0$

150 152

bit1
172
bit2
178

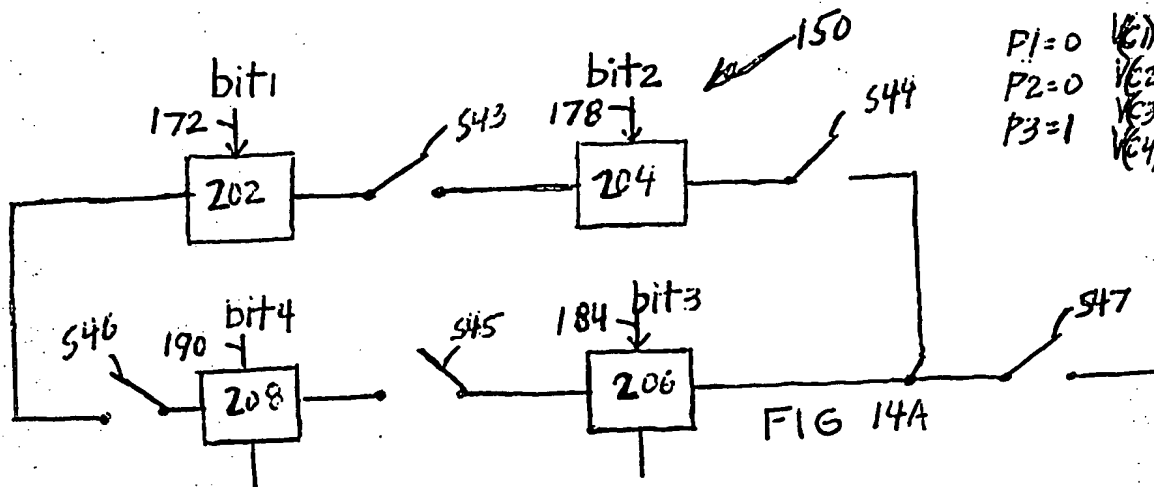


bit3
184

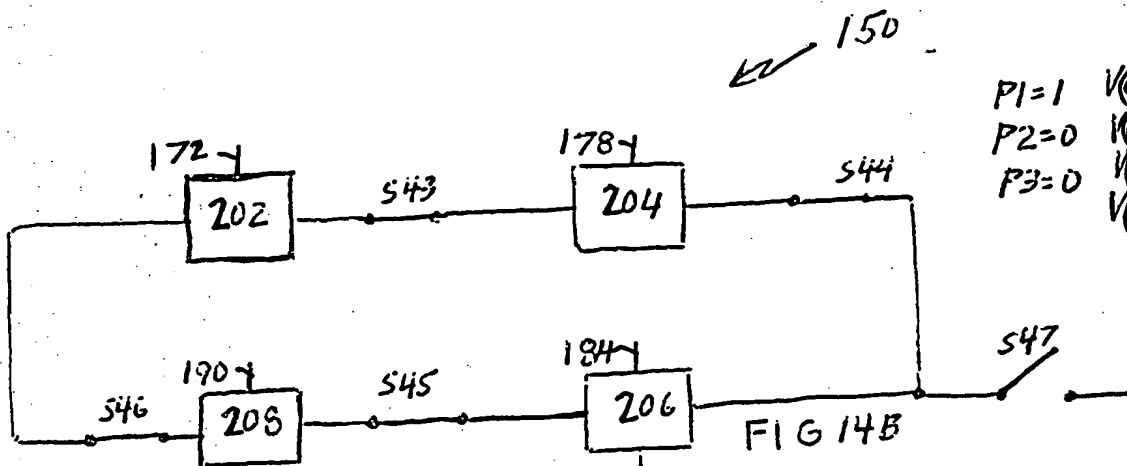


bit4
190

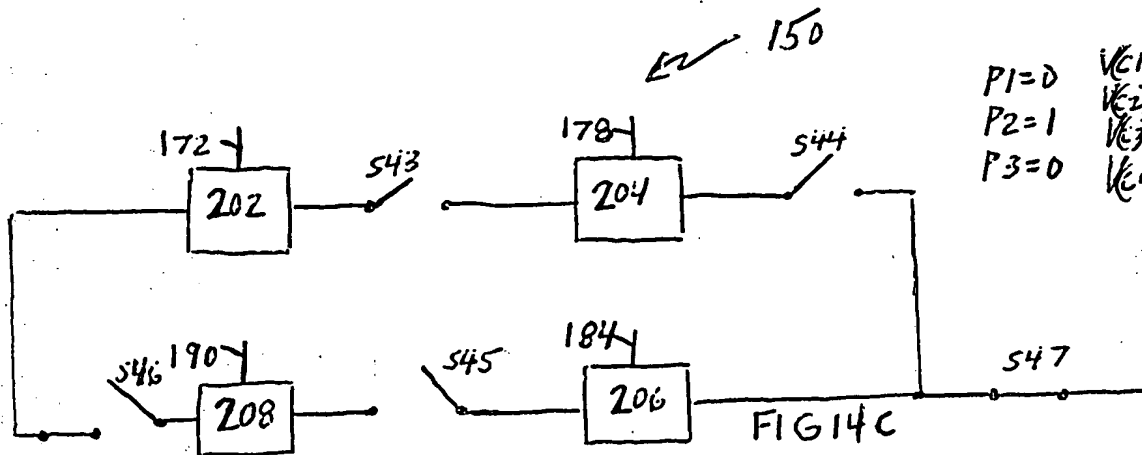
FIG. 13



$P1=0$ $V(C1)=V_{ref}$ $Q(C1)=C \times V_{ref}$
 $P2=0$ $V(C2)=0$ $Q(C2)=0$
 $P3=1$ $V(C3)=0$ $Q(C3)=0$
 $V(C4)=0$ $Q(C4)=0$



$P1=1$ $V(C1)=V_{ref}/4$ $Q(C1)=C \times V_{ref}/4$
 $P2=0$ $V(C2)=V_{ref}/4$ $Q(C2)=C \times V_{ref}/4$
 $P3=0$ $V(C3)=V_{ref}/4$ $Q(C3)=C \times V_{ref}/4$
 $V(C4)=V_{ref}/4$ $Q(C4)=C \times V_{ref}/4$



$P1=0$ $V(C1)=V_{ref}/4$ $Q(C1)=C \times V_{ref}/4$
 $P2=1$ $V(C2)=V_{ref}/4$ $Q(C2)=C \times V_{ref}/4$
 $P3=0$ $V(C3)=V_{ref}/4$ $Q(C3)=C \times V_{ref}/4$
 $V(C4)=V_{ref}/4$ $Q(C4)=C \times V_{ref}/4$

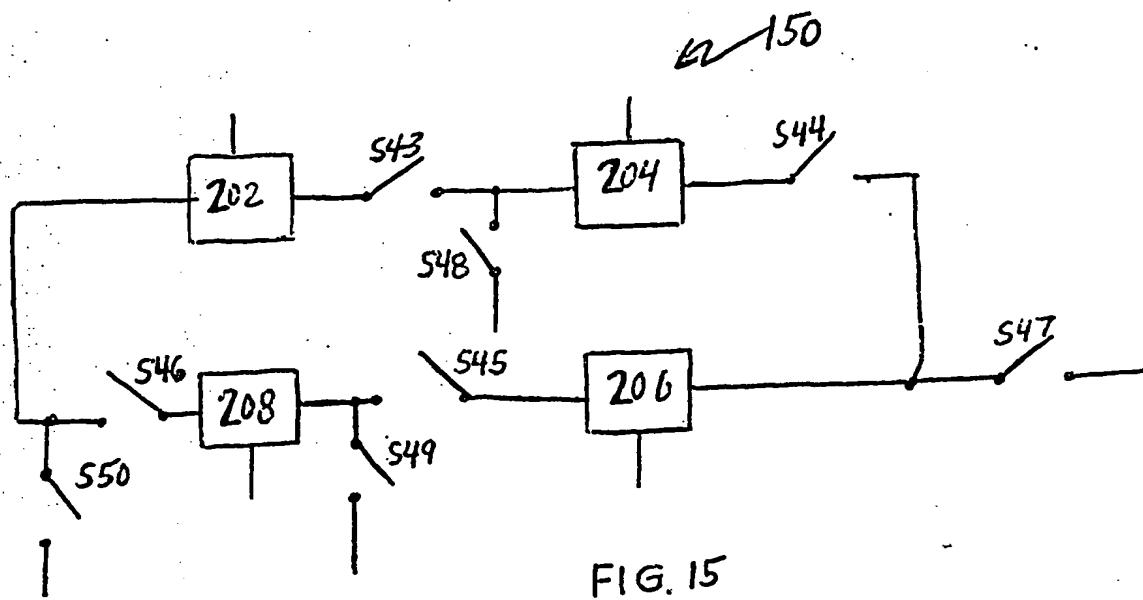


FIG. 15

FIG 16A

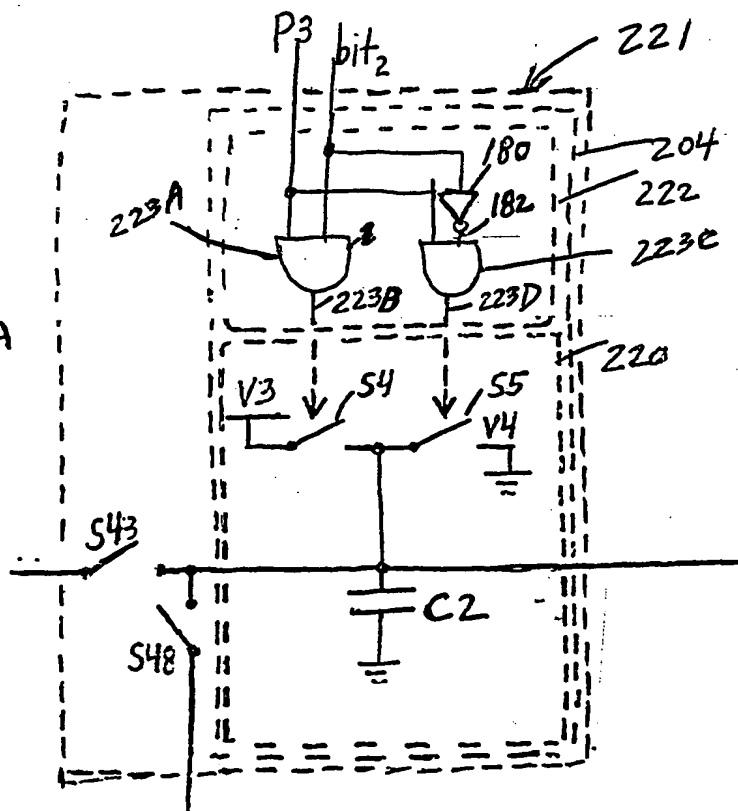
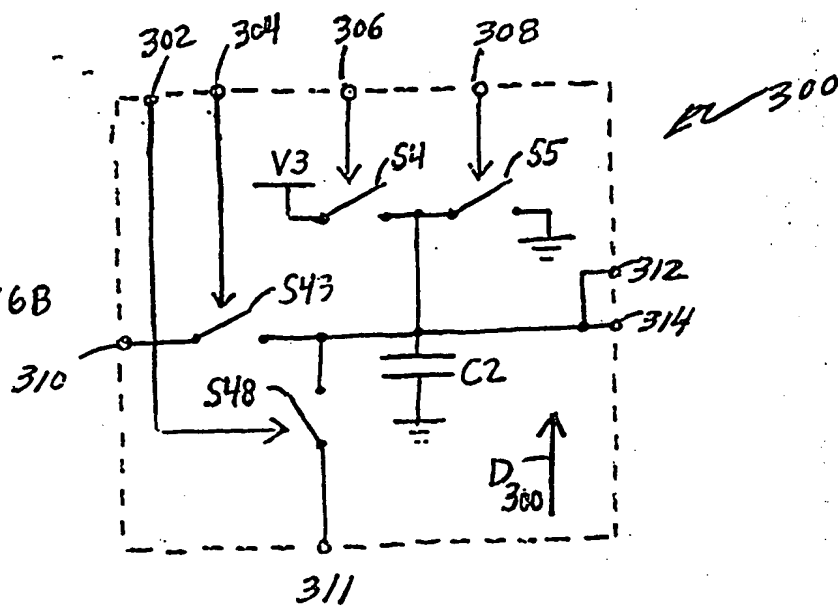
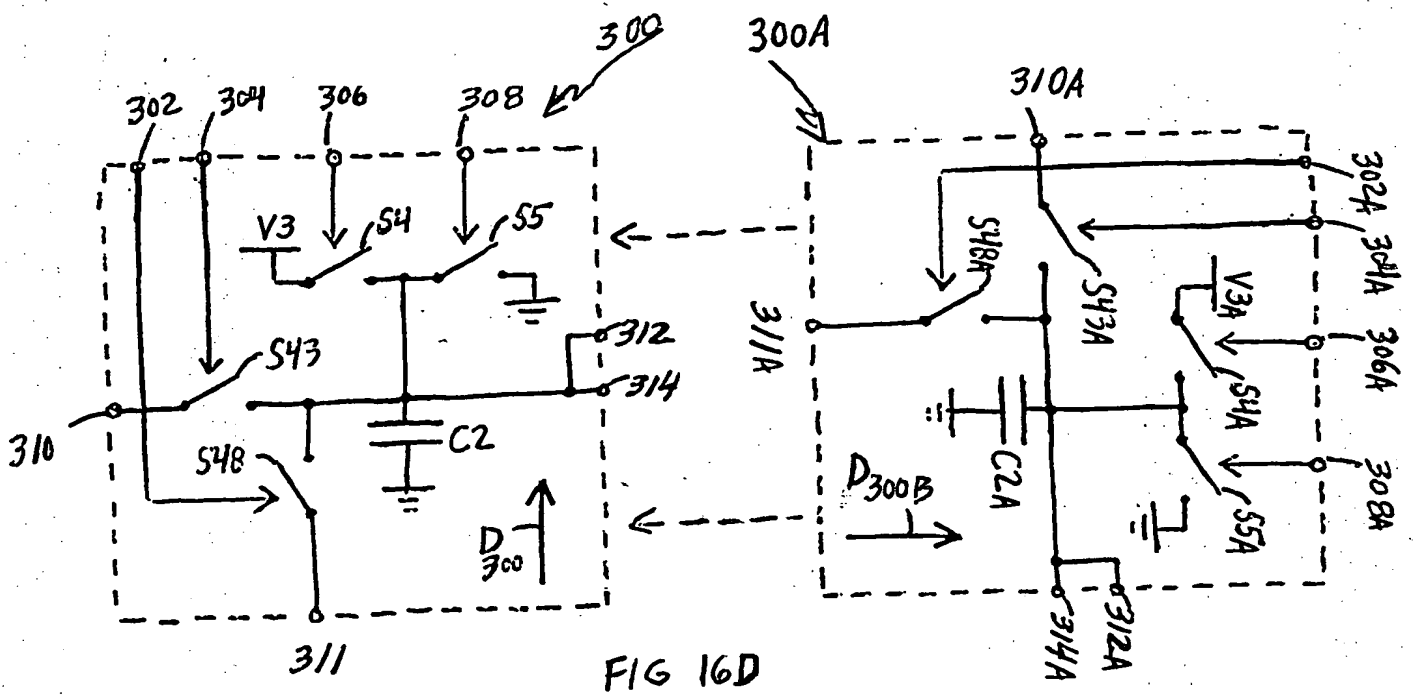
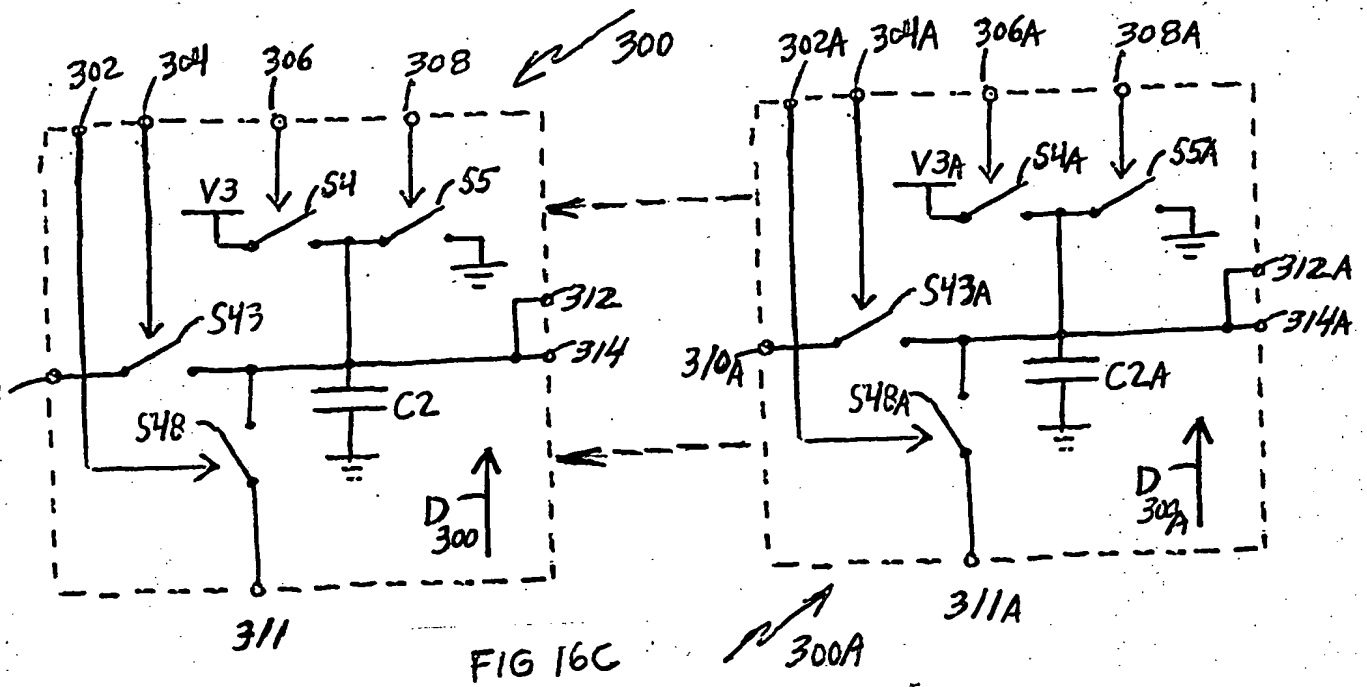
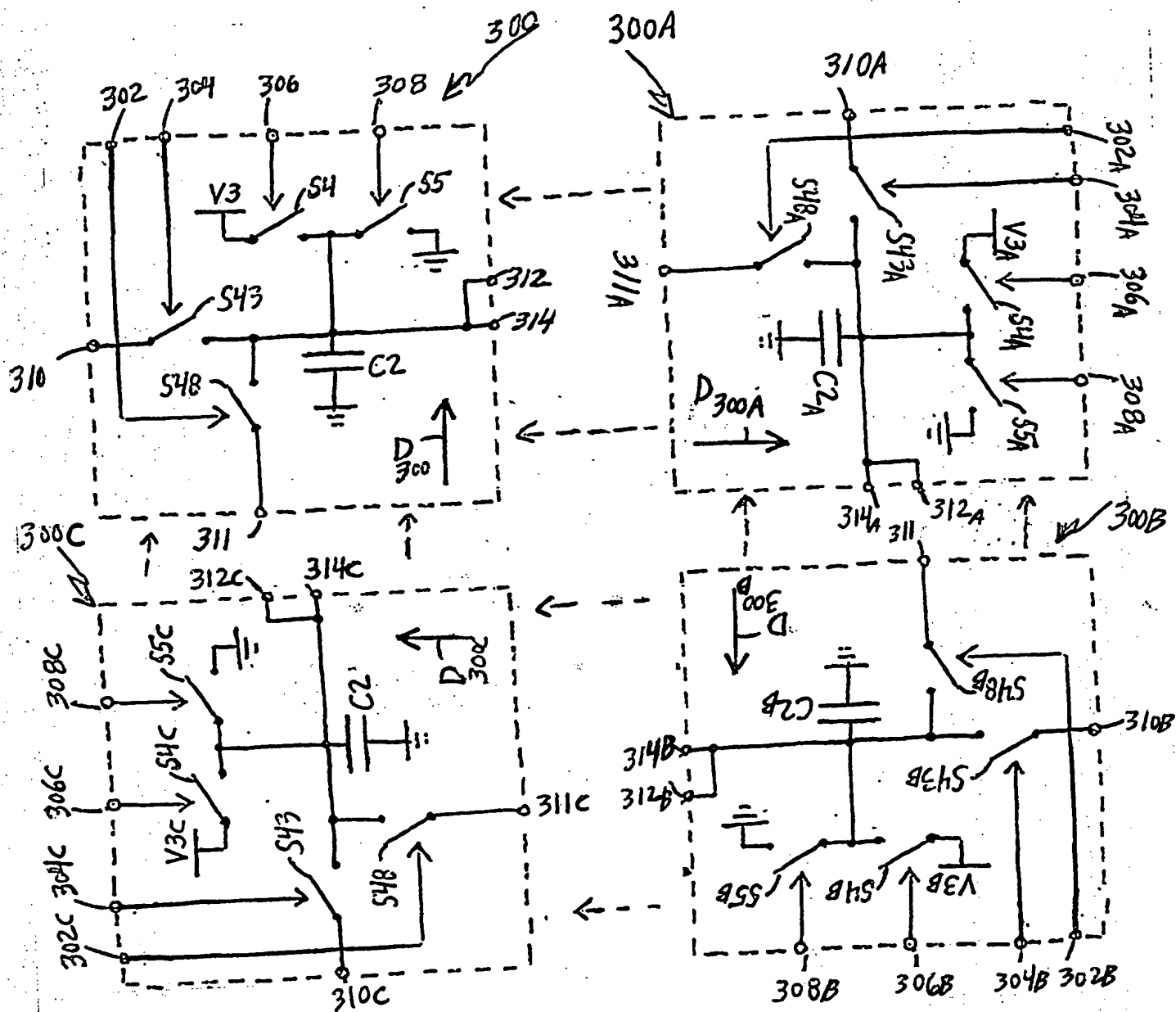


FIG 16B







16E

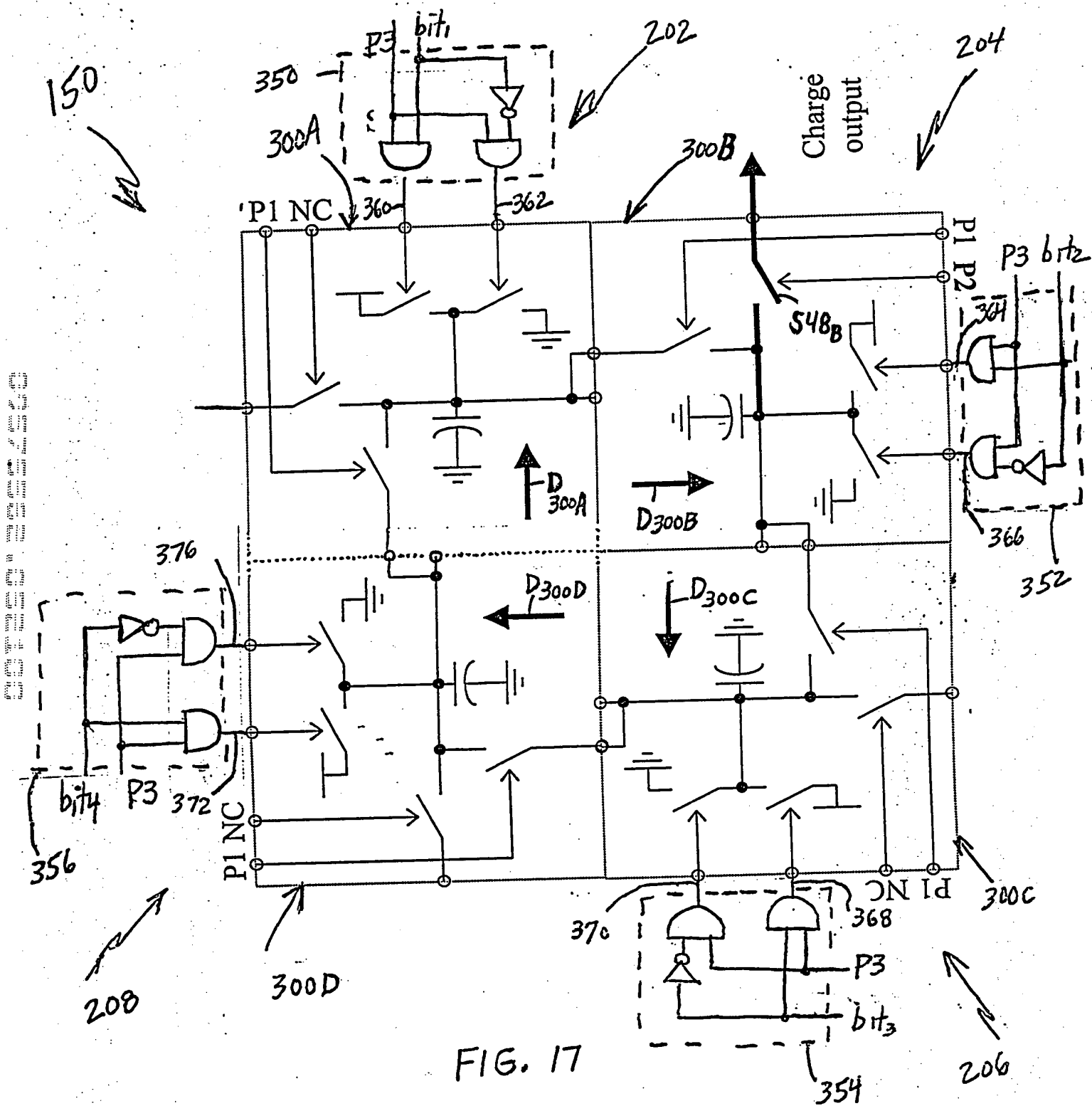


FIG. 17

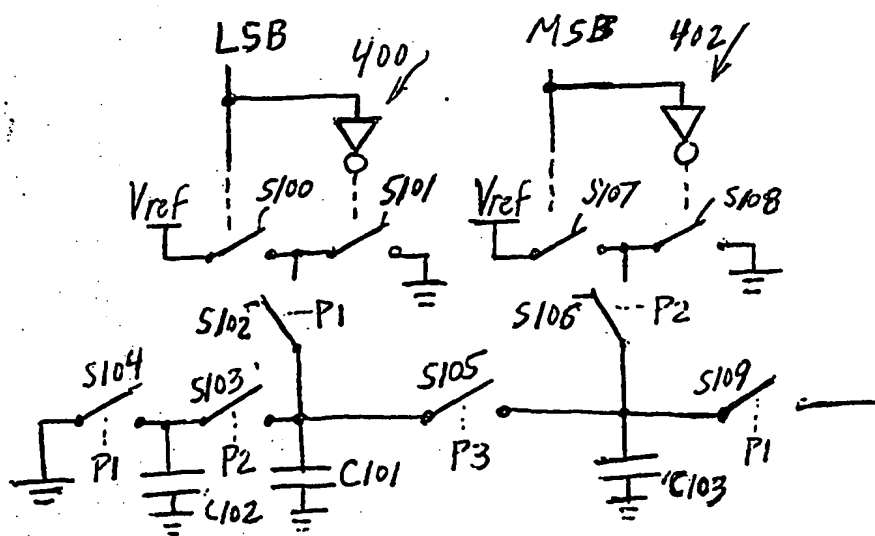
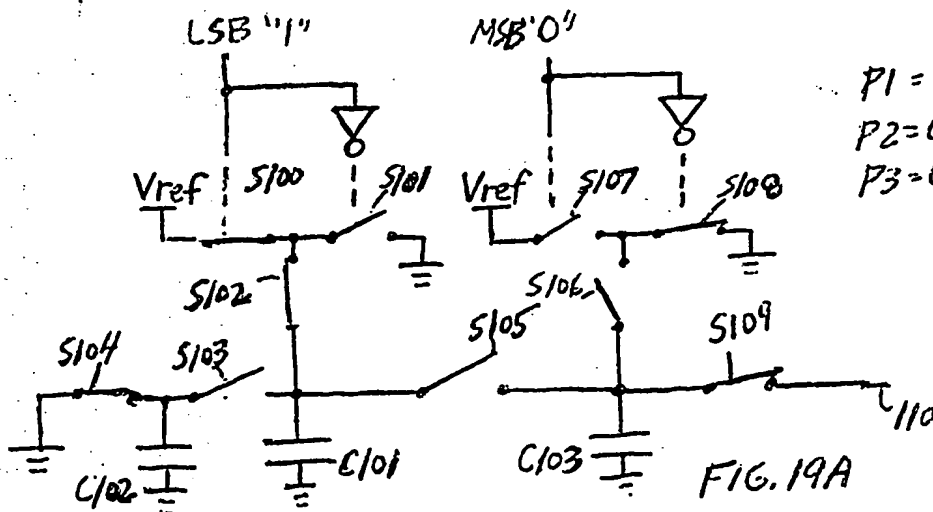
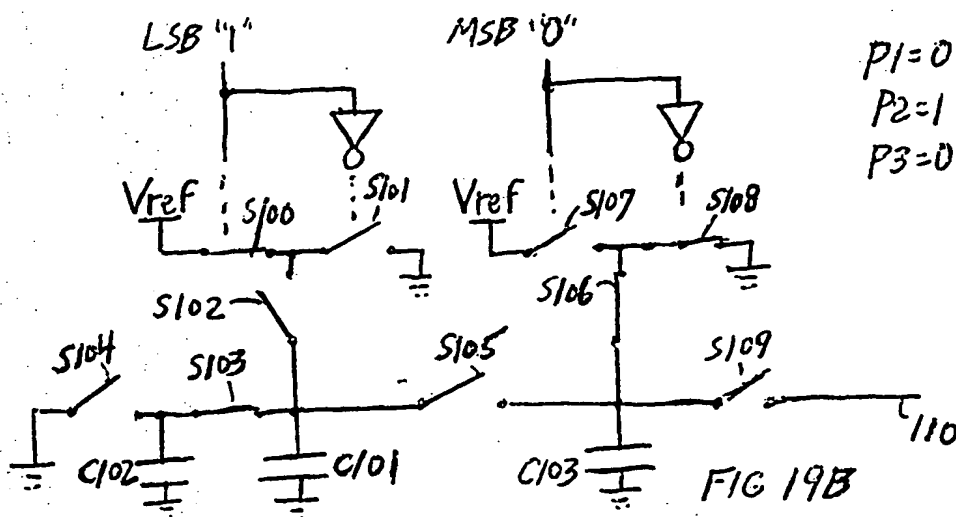


FIG. 18

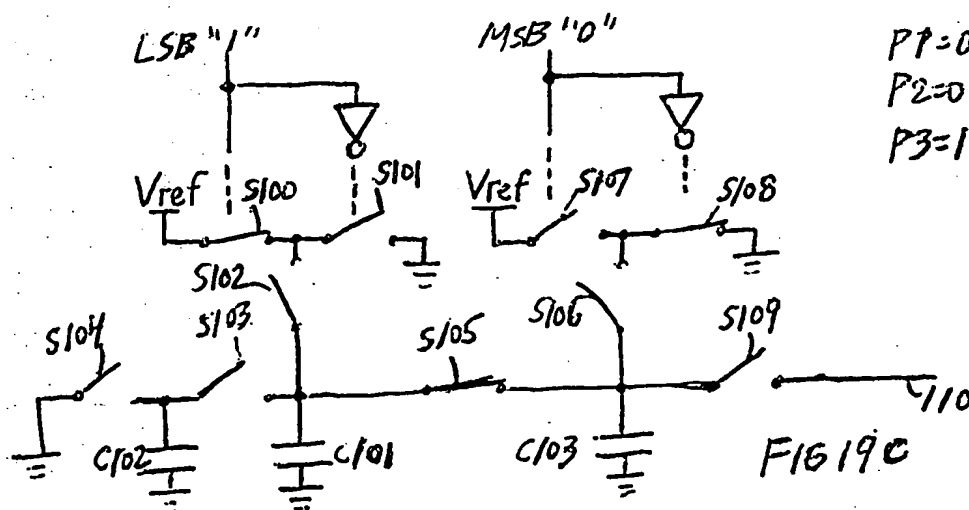
✓ 108



$$\begin{aligned}
 P1 &= 1 & V(C102) &= 0 & Q(C102) &= 0 \\
 P2 &= 0 & V(C101) &= V_{ref} & Q(C101) &= C \times V_{ref} \\
 P3 &= 0 & V(C103) &= ? & Q(C103) &= ?
 \end{aligned}$$



$$\begin{aligned}
 P1 &= 0 & V(C102) &= V_{ref}/2 & Q(C102) &= C \times V_{ref}/2 \\
 P2 &= 1 & V(C101) &= V_{ref}/2 & Q(C101) &= C \times V_{ref}/2 \\
 P3 &= 0 & V(C103) &= 0 & Q(C103) &= 0
 \end{aligned}$$



$$\begin{aligned}
 P1 &= 0 & V(C102) &= V_{ref}/2 & Q(C102) &= C \times V_{ref}/2 \\
 P2 &= 0 & V(C101) &= V_{ref}/4 & Q(C101) &= C \times V_{ref}/4 \\
 P3 &= 1 & V(C103) &= V_{ref}/4 & Q(C103) &= C \times V_{ref}/4
 \end{aligned}$$

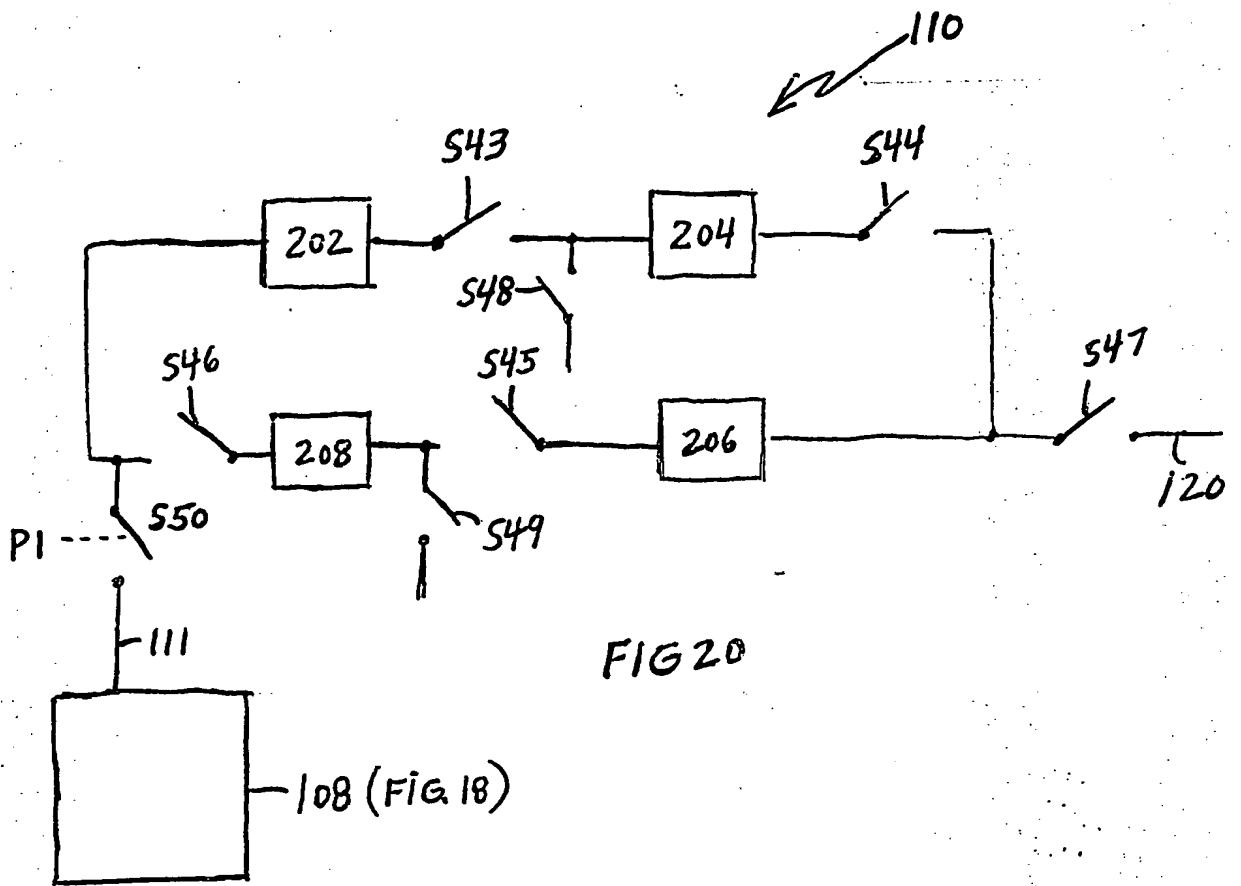


FIG 20

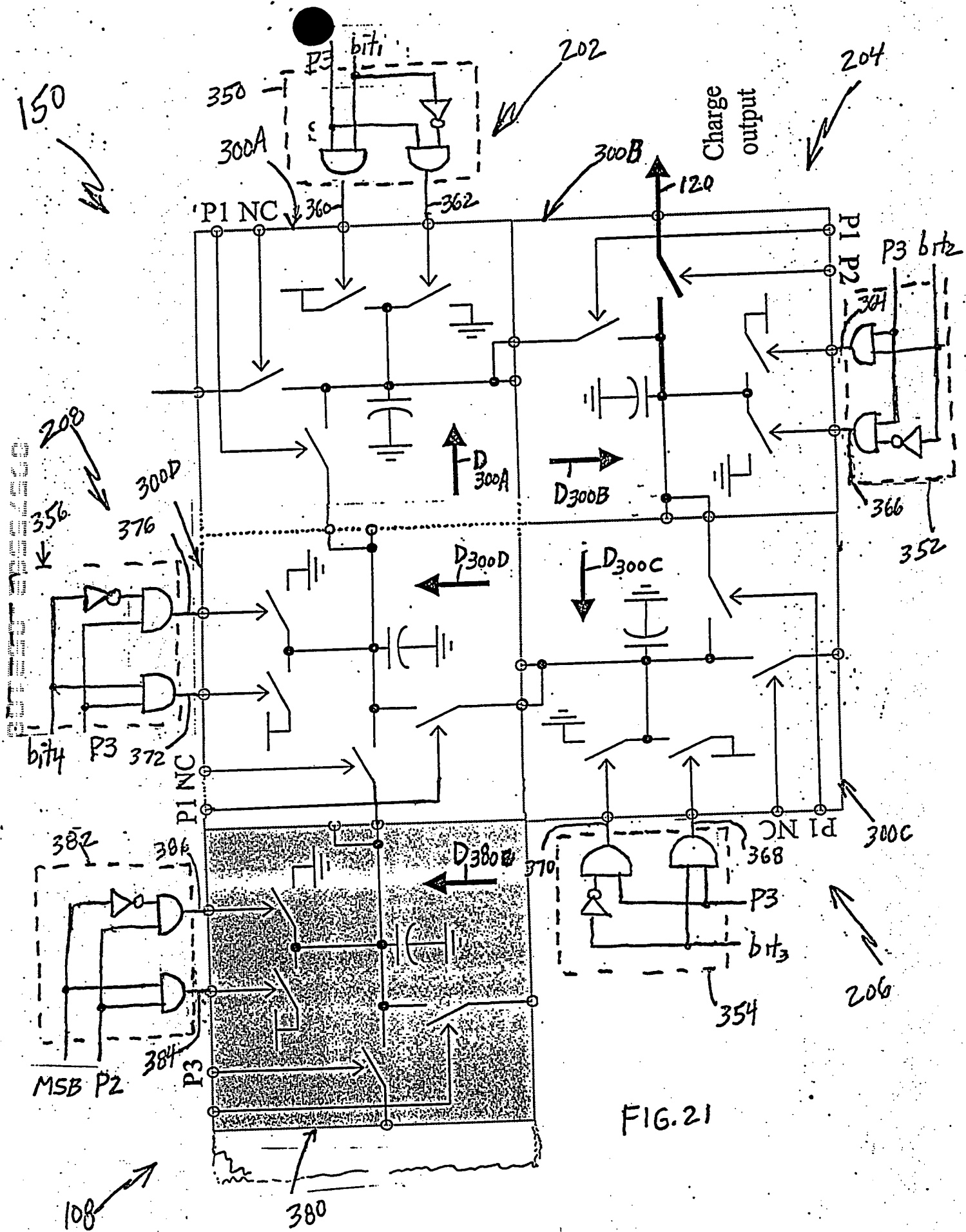
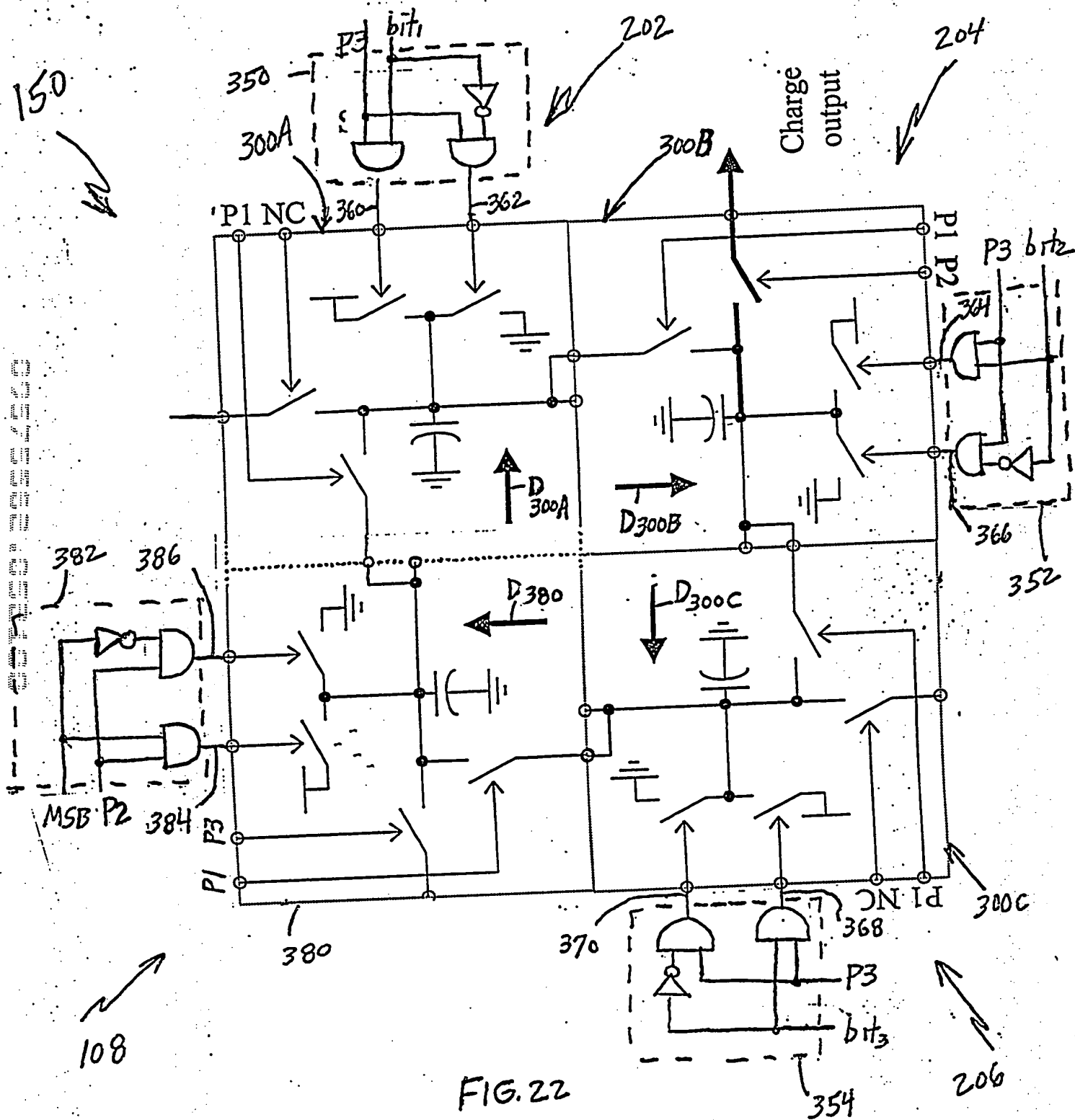


FIG. 21



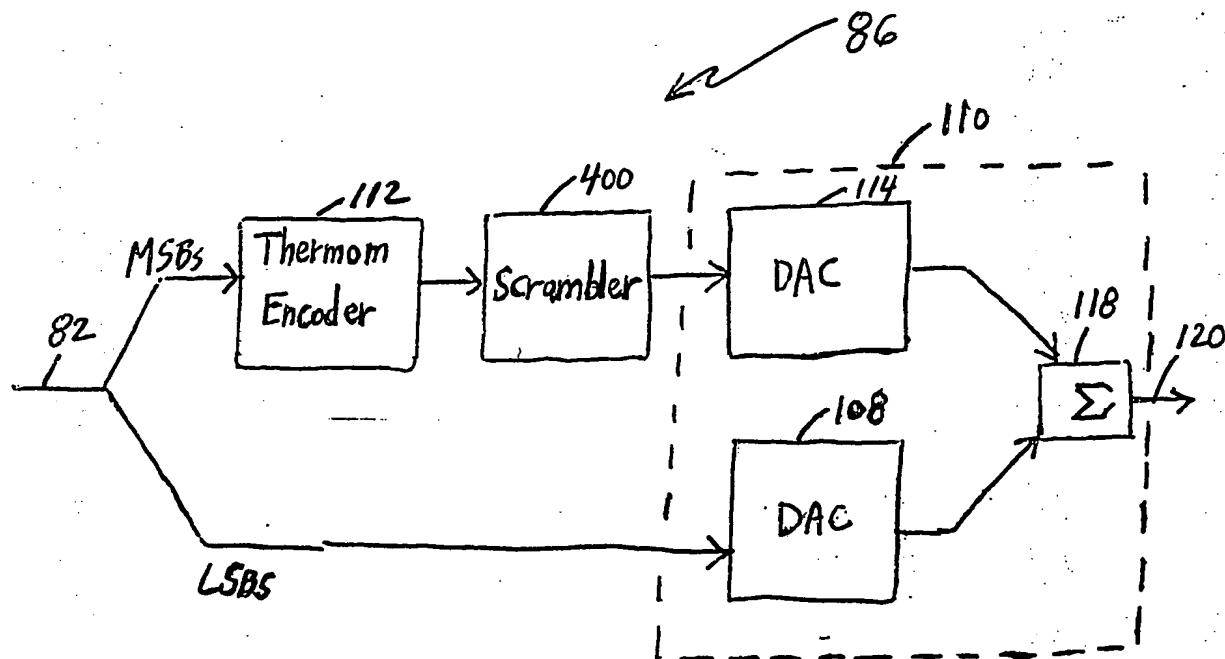


FIG. 23

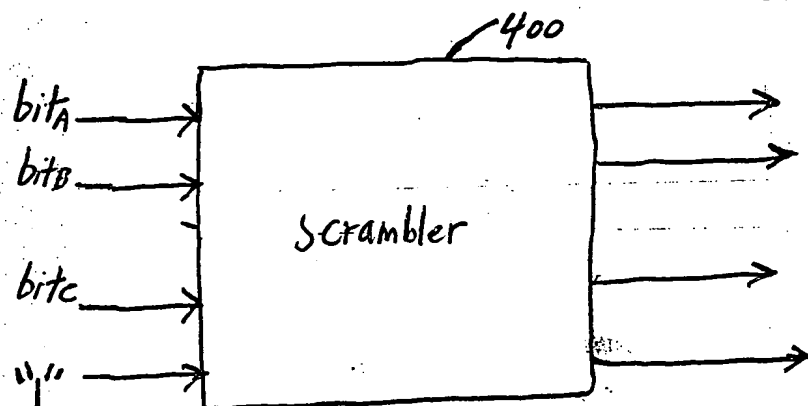
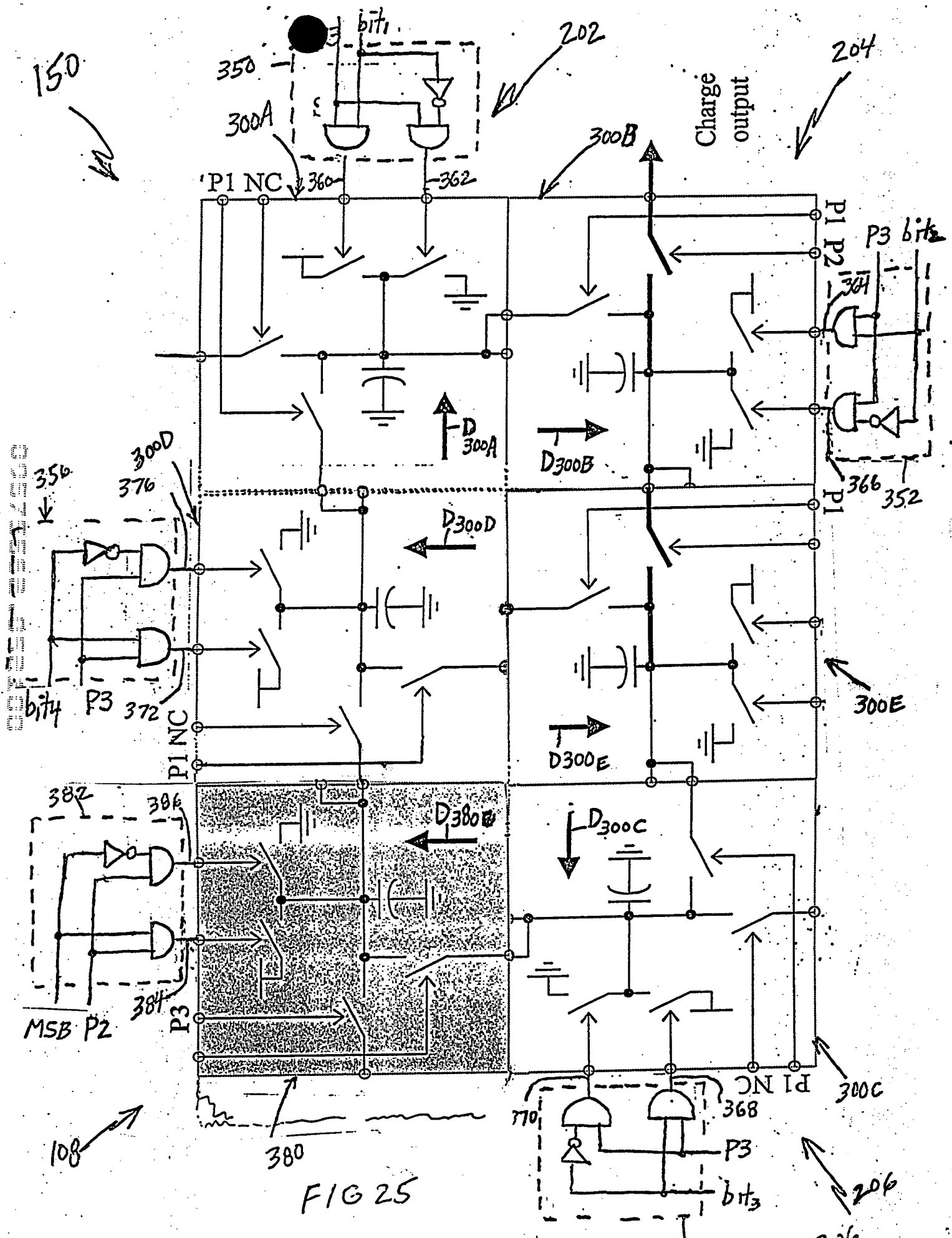


FIG 24



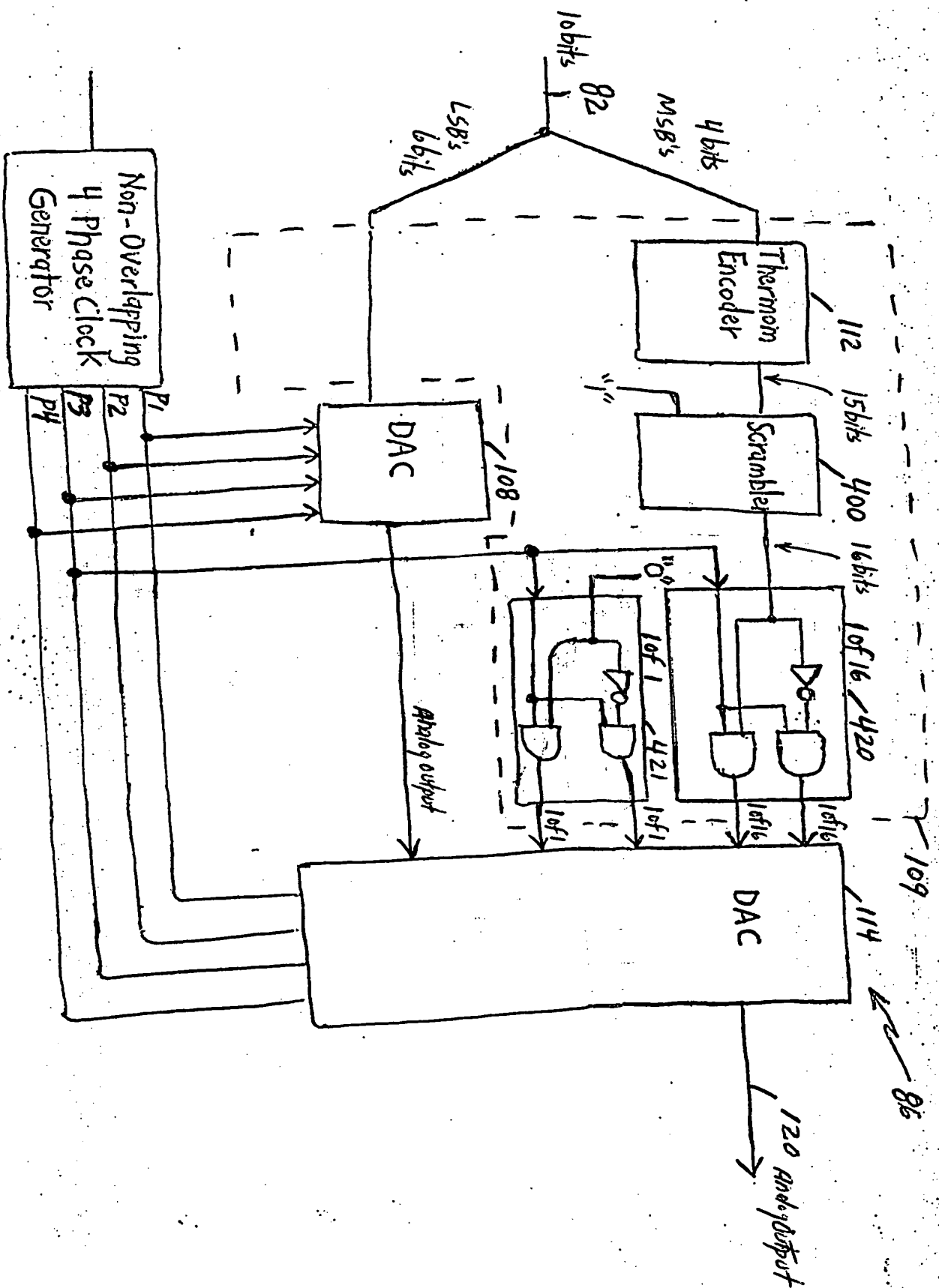


FIG 24

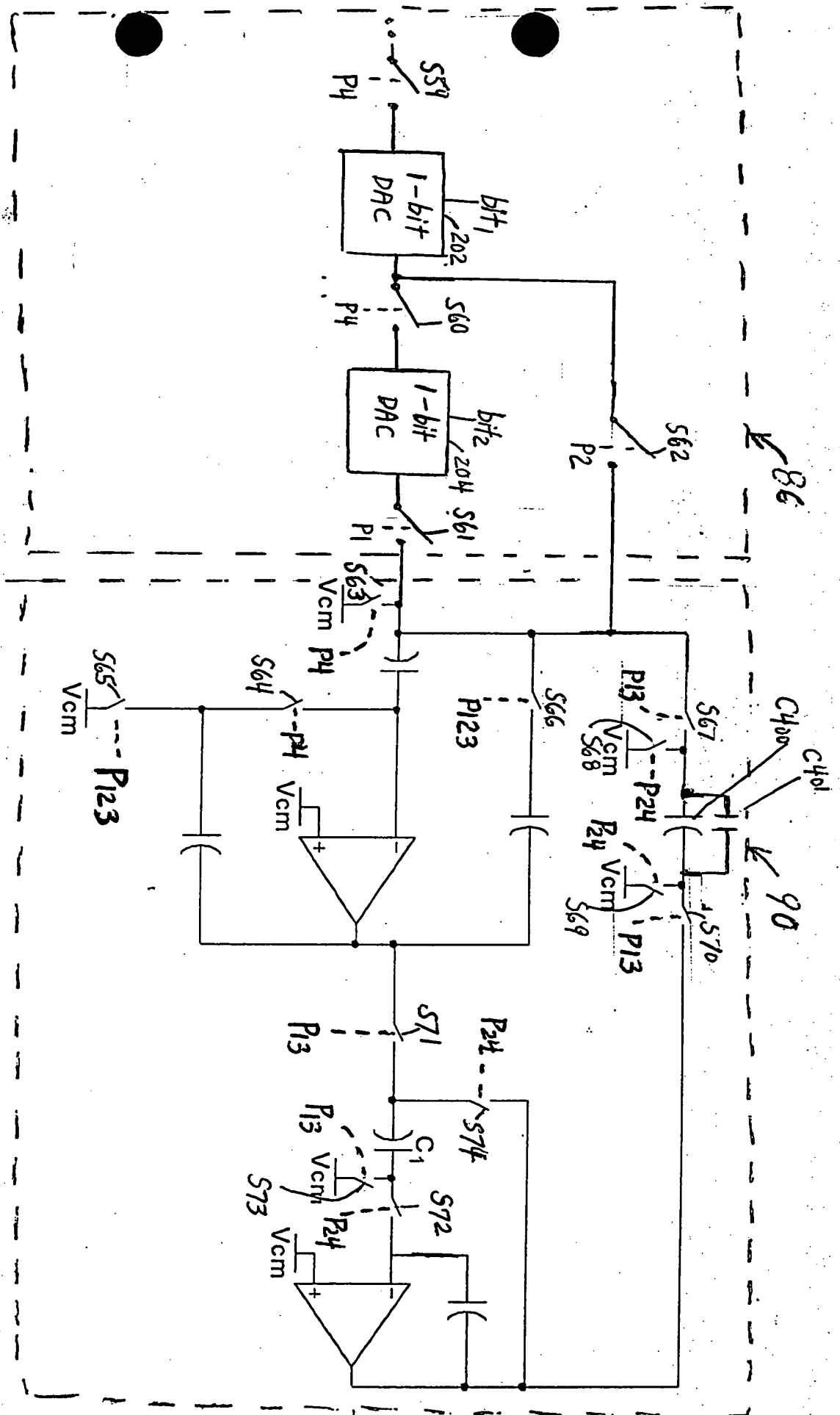


FIG 27

FIG 28A

450

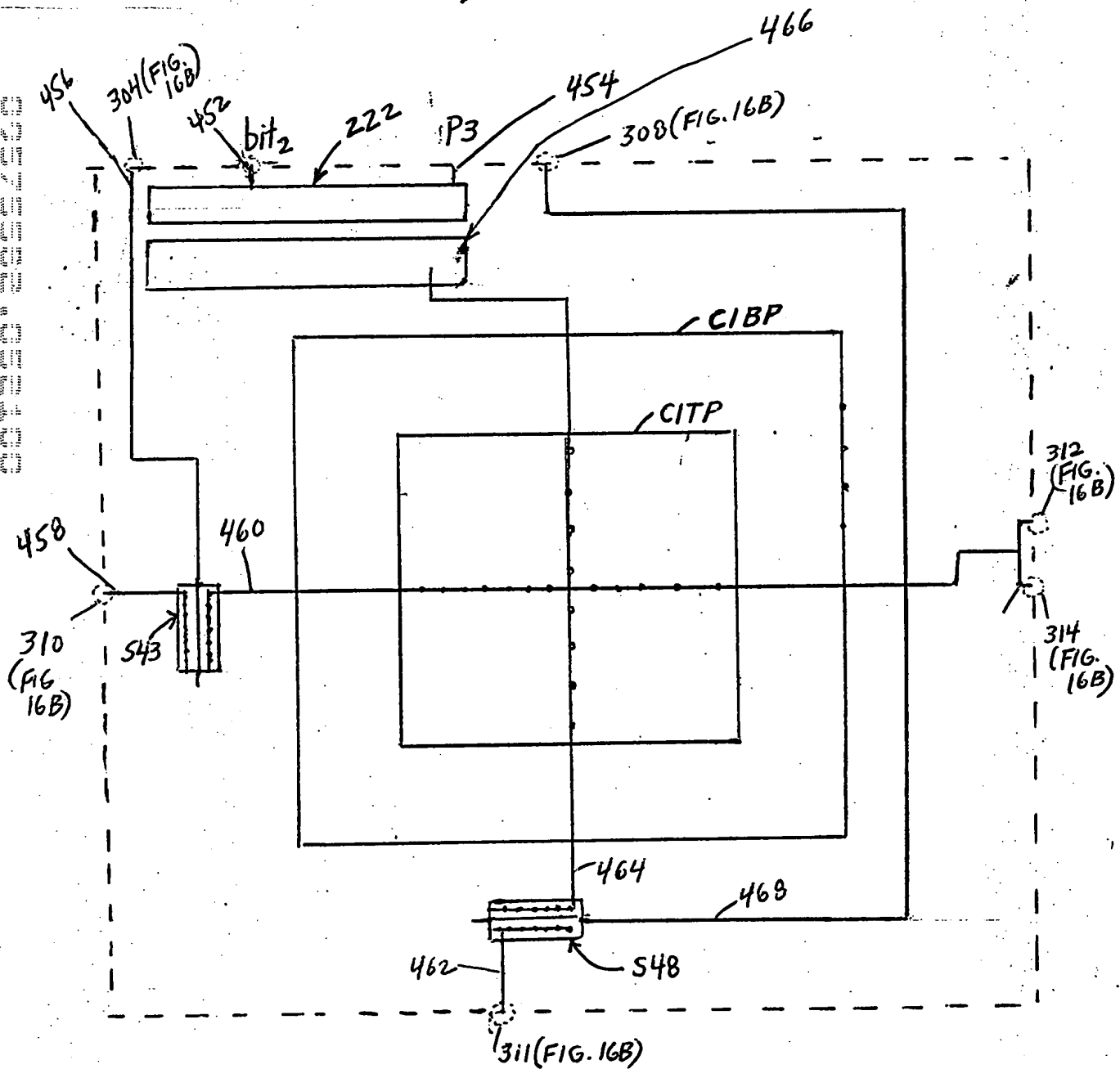
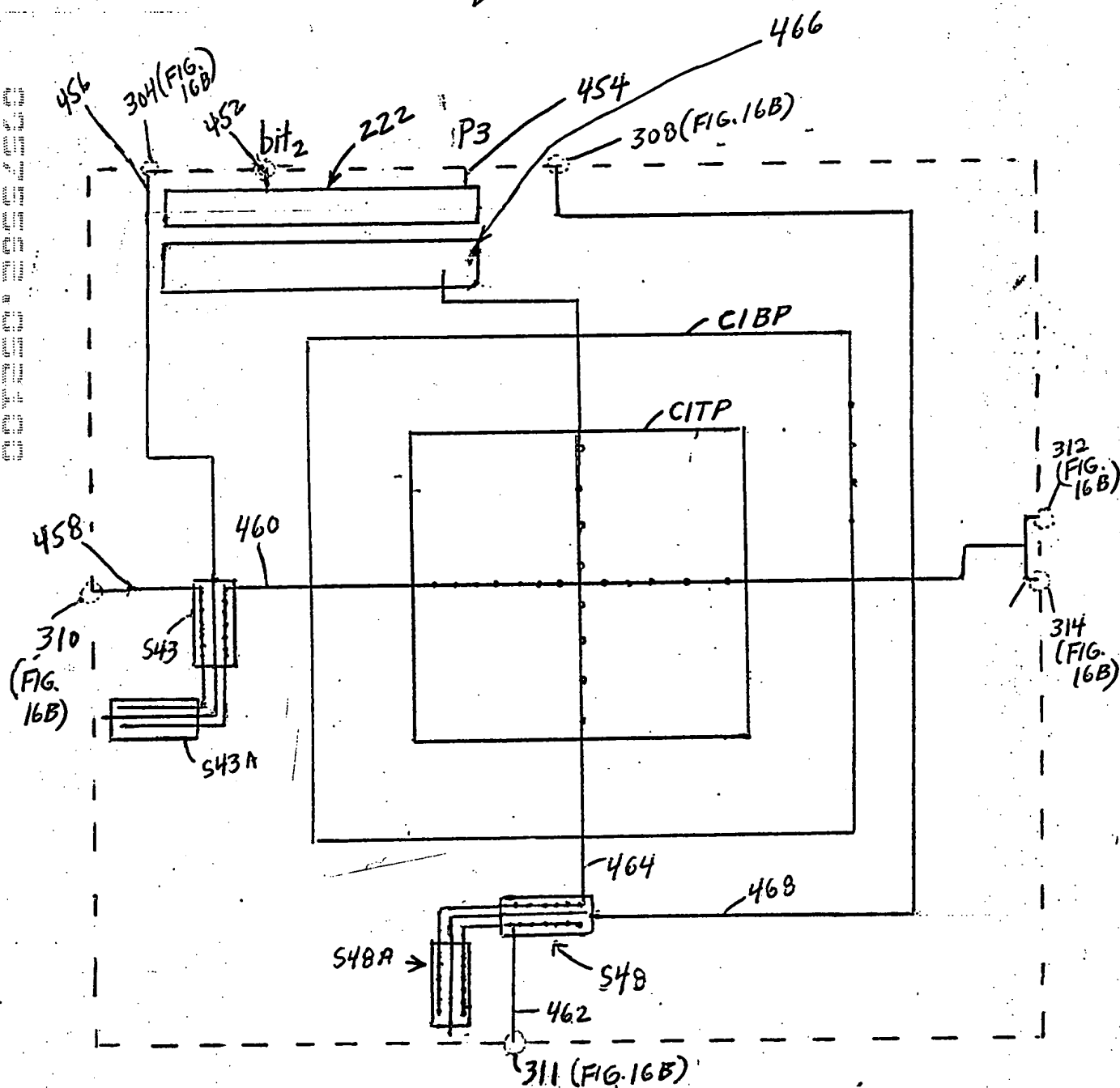


FIG 28B

450



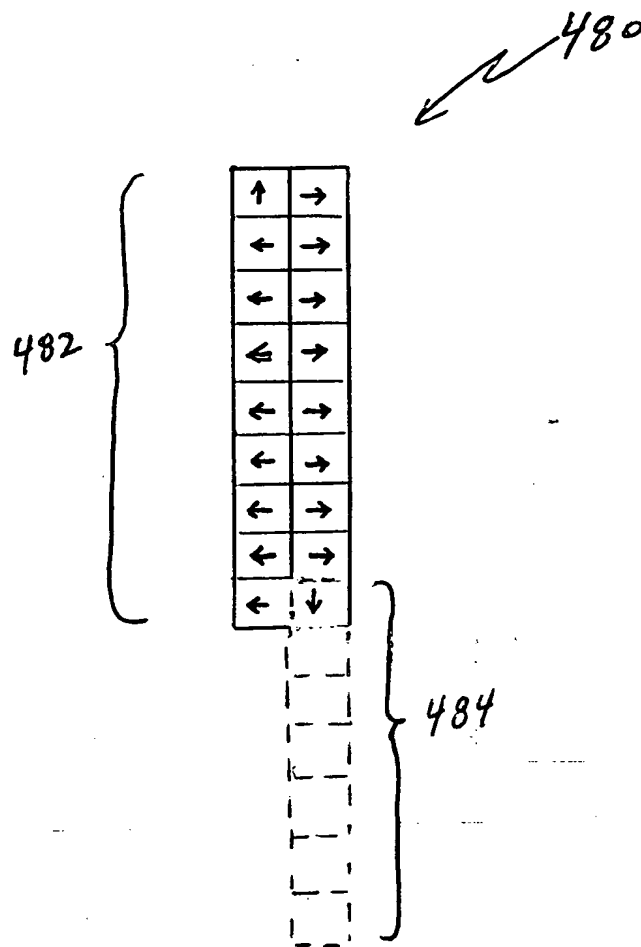
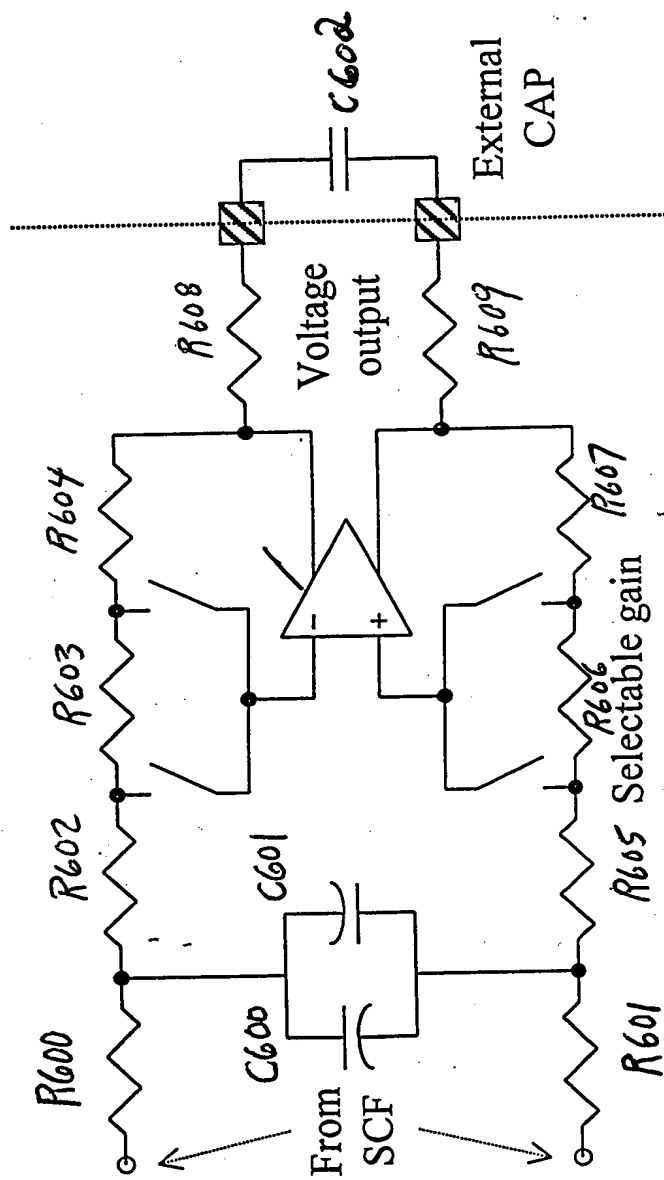


FIG. 29



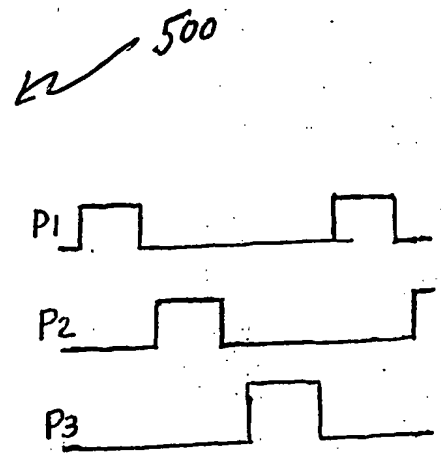
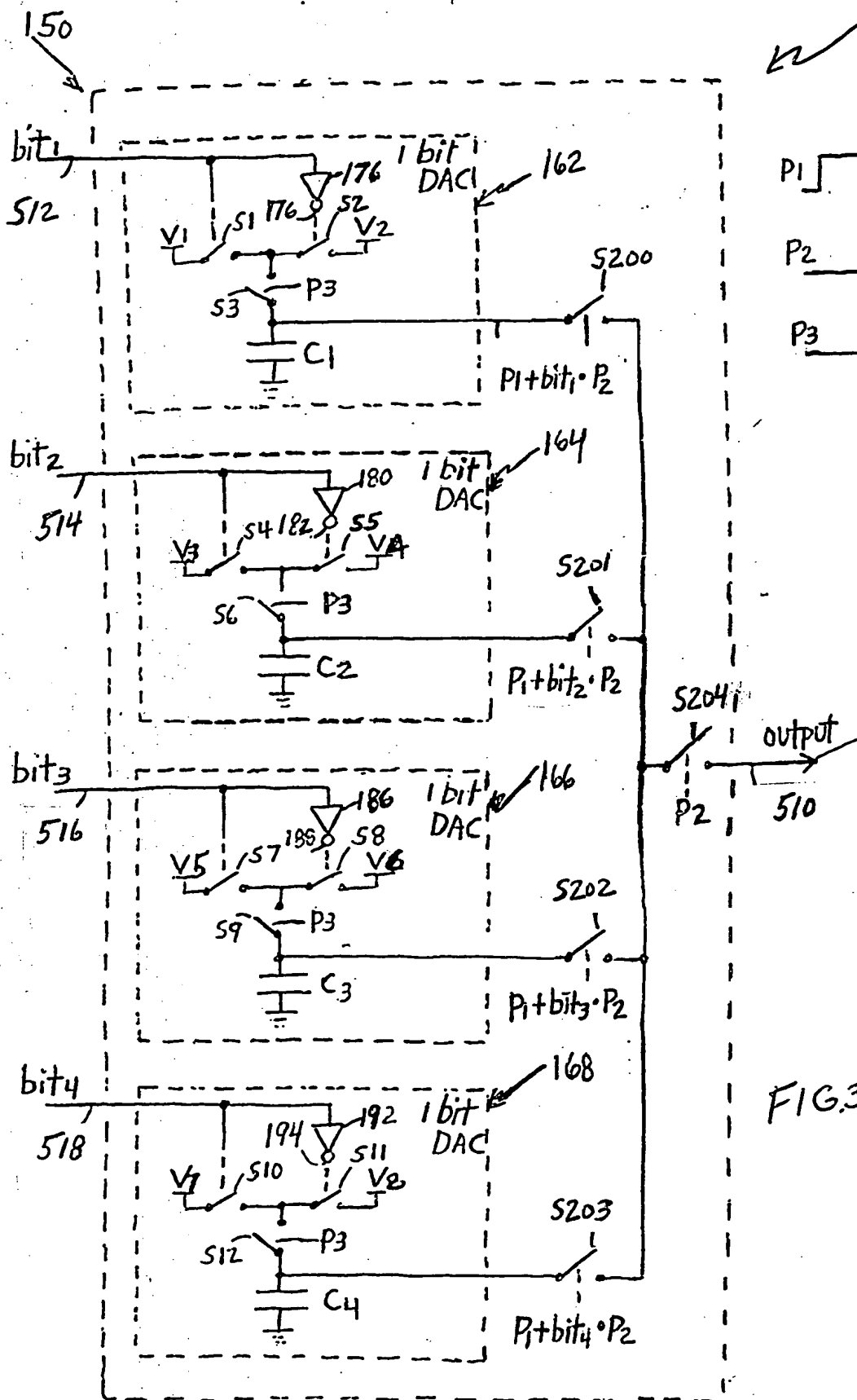


FIG. 32

FIG. 31

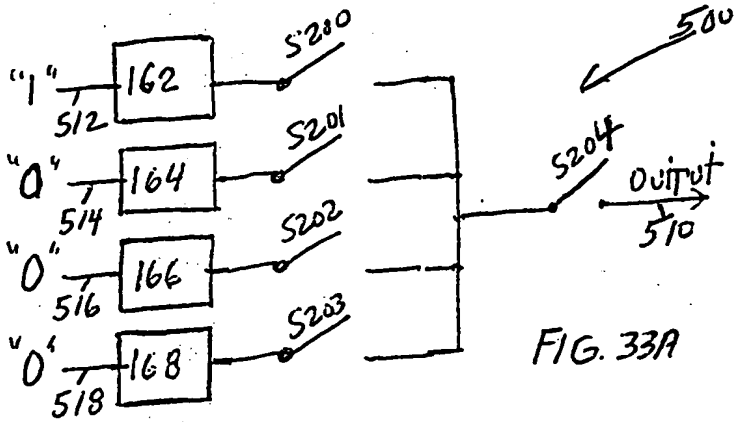


FIG. 33A

P1 "0"	$V(C_1) = V_{ref}$	$Q(C_1) = C \cdot V_{ref}$
P2 "0"	$V(C_2) = 0$	$Q(C_2) = 0$
P3 "1"	$V(C_3) = 0$	$Q(C_3) = 0$
	$V(C_4) = 0$	$Q(C_4) = 0$

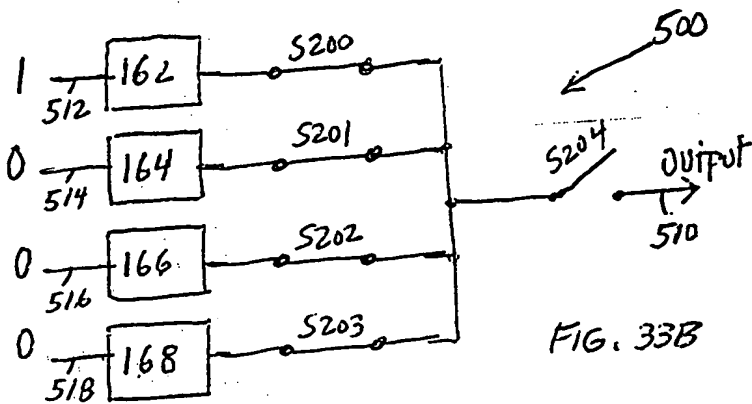


FIG. 33B

P1 "1"	$V(C_1) = V_{ref}/4$	$Q(C_1) = C \cdot V_{ref}/4$
P2 "0"	$V(C_2) = V_{ref}/4$	$Q(C_2) = C \cdot V_{ref}/4$
P3 "0"	$V(C_3) = V_{ref}/4$	$Q(C_3) = C \cdot V_{ref}/4$
	$V(C_4) = V_{ref}/4$	$Q(C_4) = C \cdot V_{ref}/4$

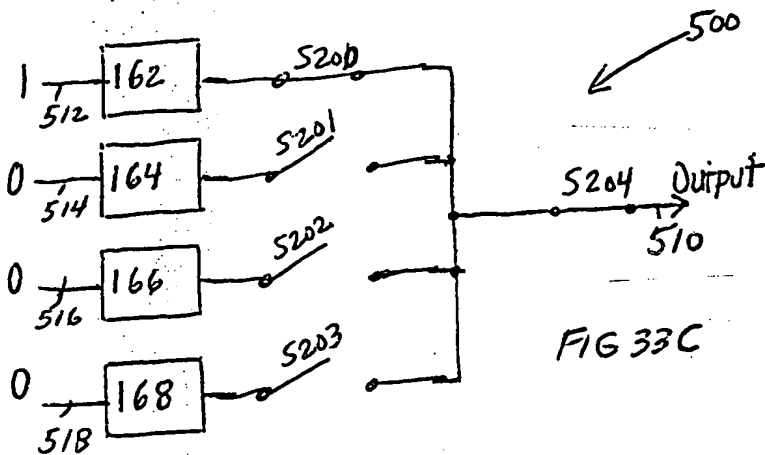
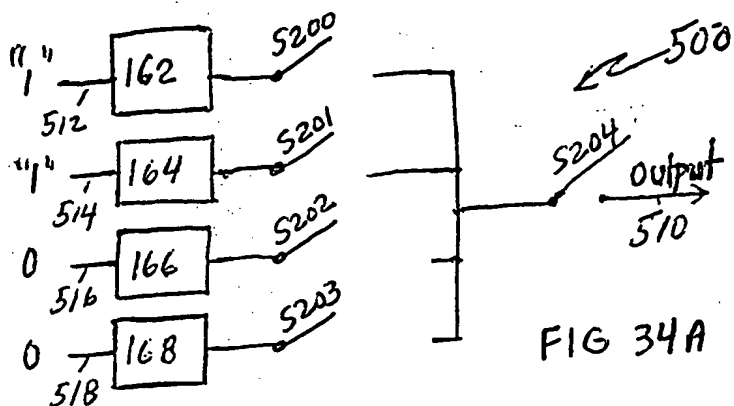


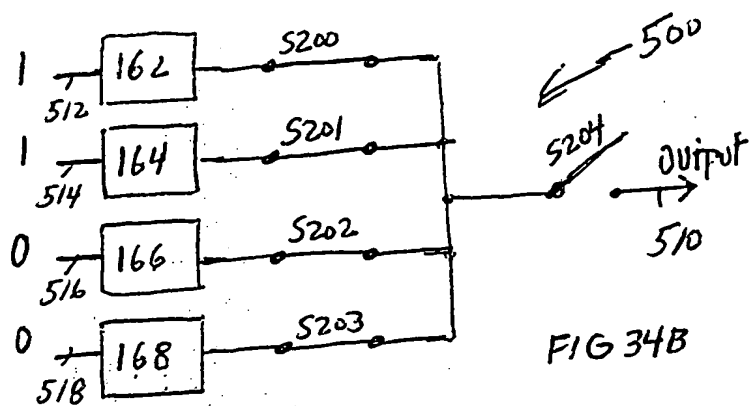
FIG. 33C

P1 "0"	$V(C_1) = V_{ref}/4$	$Q(C_1) = C \cdot V_{ref}/4$
P2 "1"	$V(C_2) = V_{ref}/4$	$Q(C_2) = C \cdot V_{ref}/4$
P3 "0"	$V(C_3) = V_{ref}/4$	$Q(C_3) = C \cdot V_{ref}/4$
	$V(C_4) = V_{ref}/4$	$Q(C_4) = C \cdot V_{ref}/4$

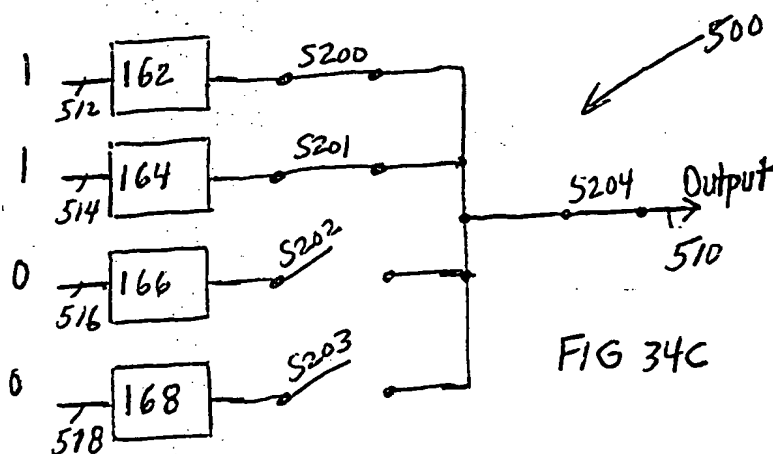
Q delivered to
output terminal
is $Q(C_1) = C \cdot V_{ref}/4$



P1 "0"	$V(C_1) = V_{ref}$	$Q(C_1) = C + V_{ref}$
P2 "0"	$V(C_2) = V_{ref}$	$Q(C_2) = C + V_{ref}$
P3 "1"	$V(C_3) = 0$	$Q(C_3) = 0$
	$V(C_4) = 0$	$Q(C_4) = 0$



P1 "1"	$V(C_1) = V_{ref}/2$	$Q(C_1) = C + V_{ref}/2$
P2 "0"	$V(C_2) = V_{ref}/2$	$Q(C_2) = C + V_{ref}/2$
P3 "0"	$V(C_3) = V_{ref}/2$	$Q(C_3) = C + V_{ref}/2$
	$V(C_4) = V_{ref}/2$	$Q(C_4) = C + V_{ref}/2$



P1 "0"	$V(C_1) = V_{ref}/2$	$Q(C_1) = C + V_{ref}/2$
P2 "1"	$V(C_2) = V_{ref}/2$	$Q(C_2) = C + V_{ref}/2$
P3 "0"	$V(C_3) = V_{ref}/2$	$Q(C_3) = C + V_{ref}/2$
	$V(C_4) = V_{ref}/2$	$Q(C_4) = C + V_{ref}/2$

Q delivered to output terminal
is $Q(C_1) + Q(C_2) =$

$$C + V_{ref}/2 + C + V_{ref}/2 = C * V_{ref}$$

800

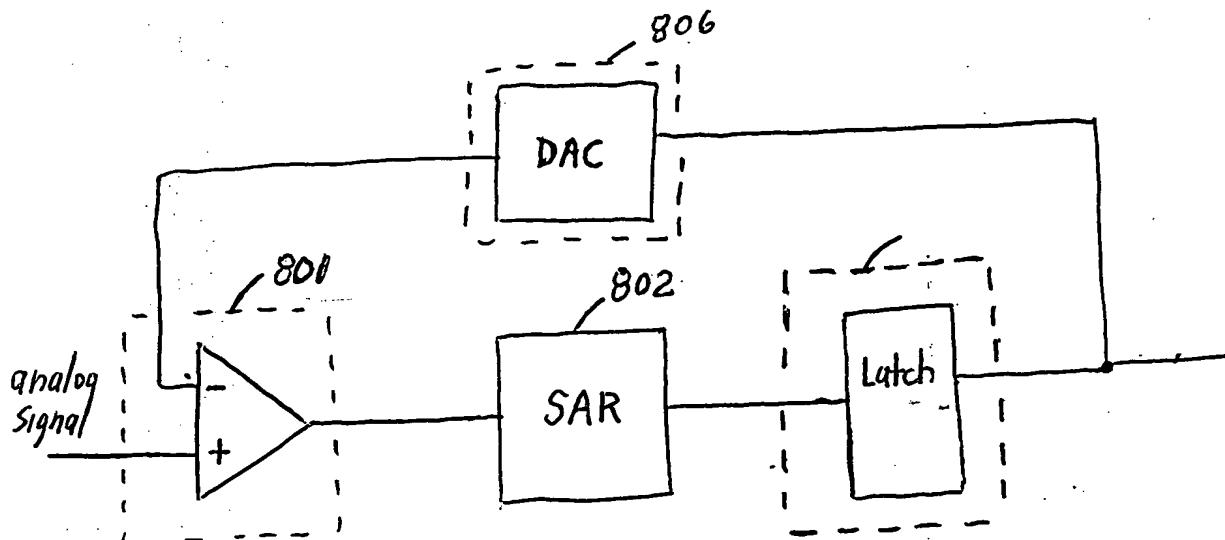


FIG. 35